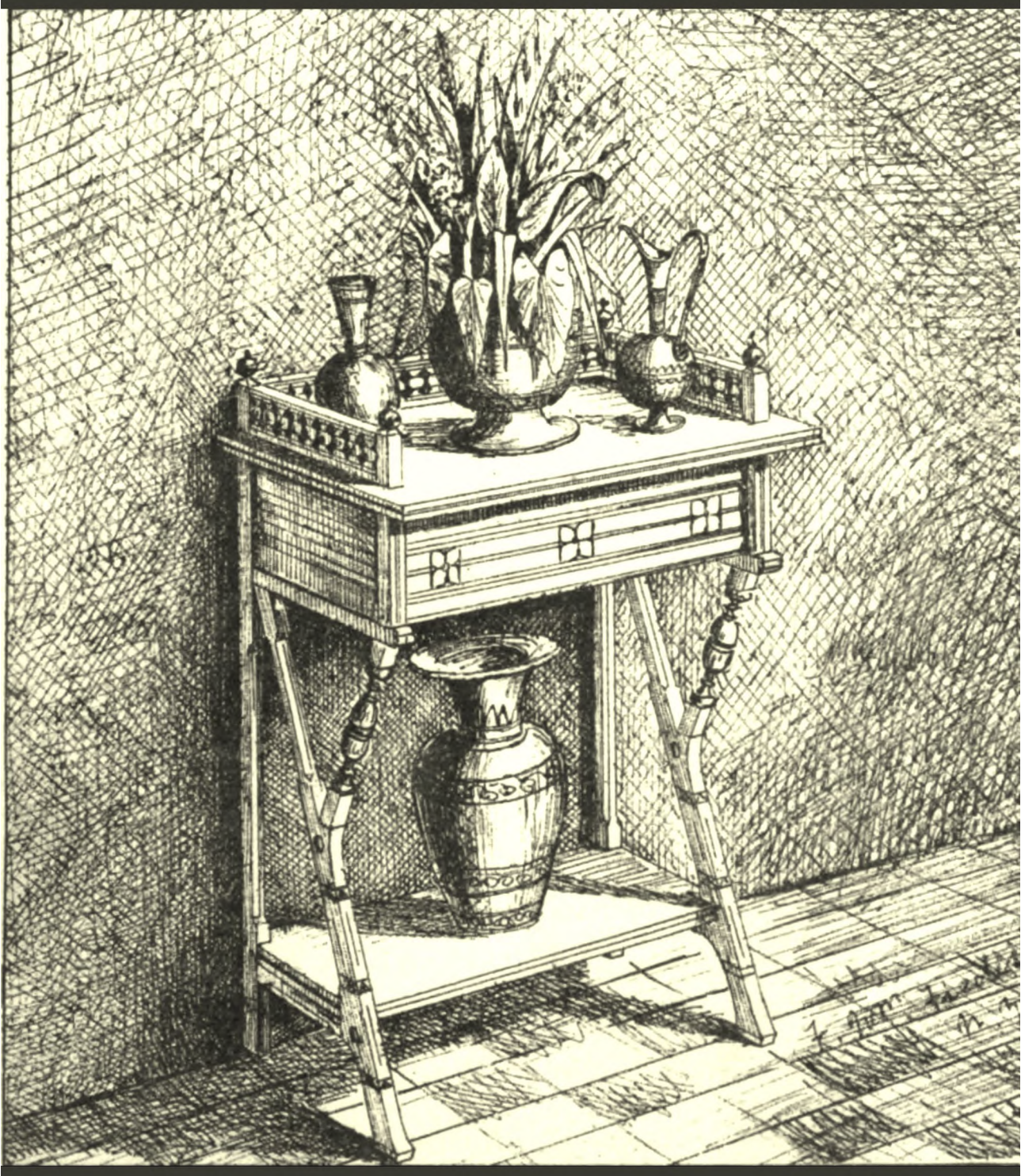

The Illustrated Wood Worker

Frederick Thomas Hodgson

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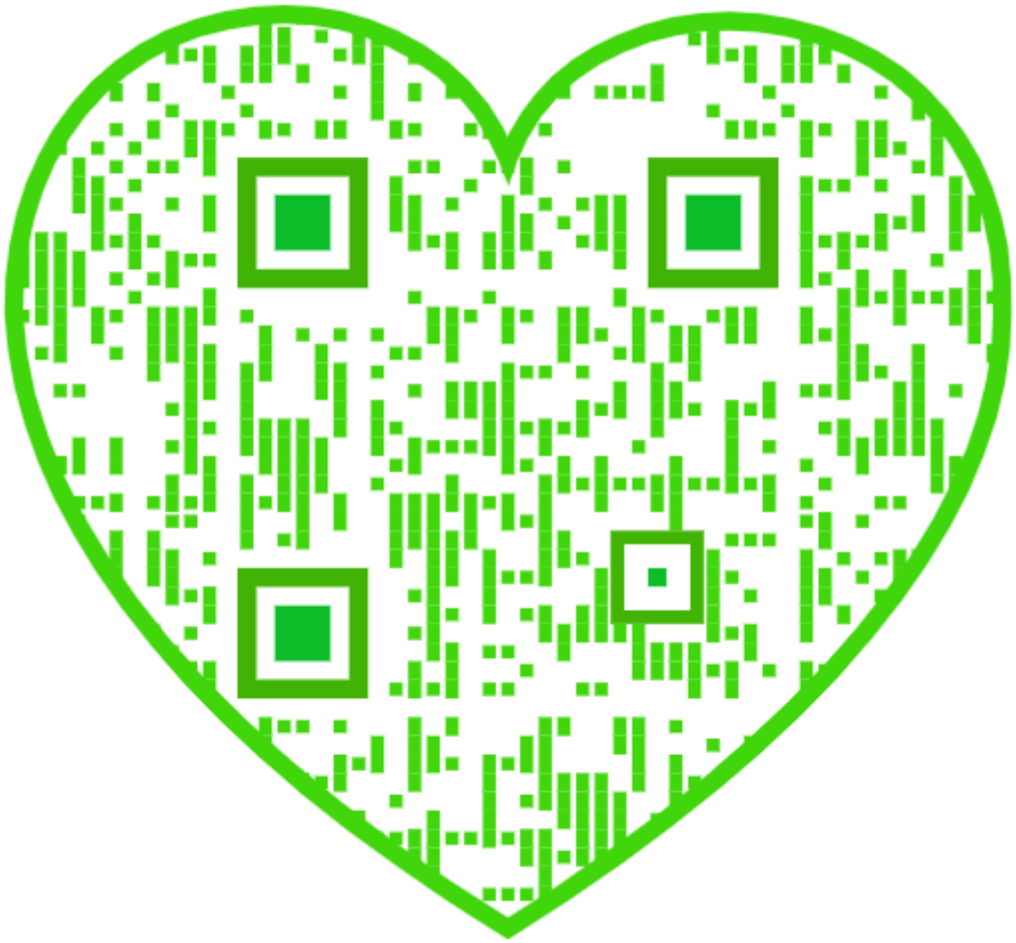

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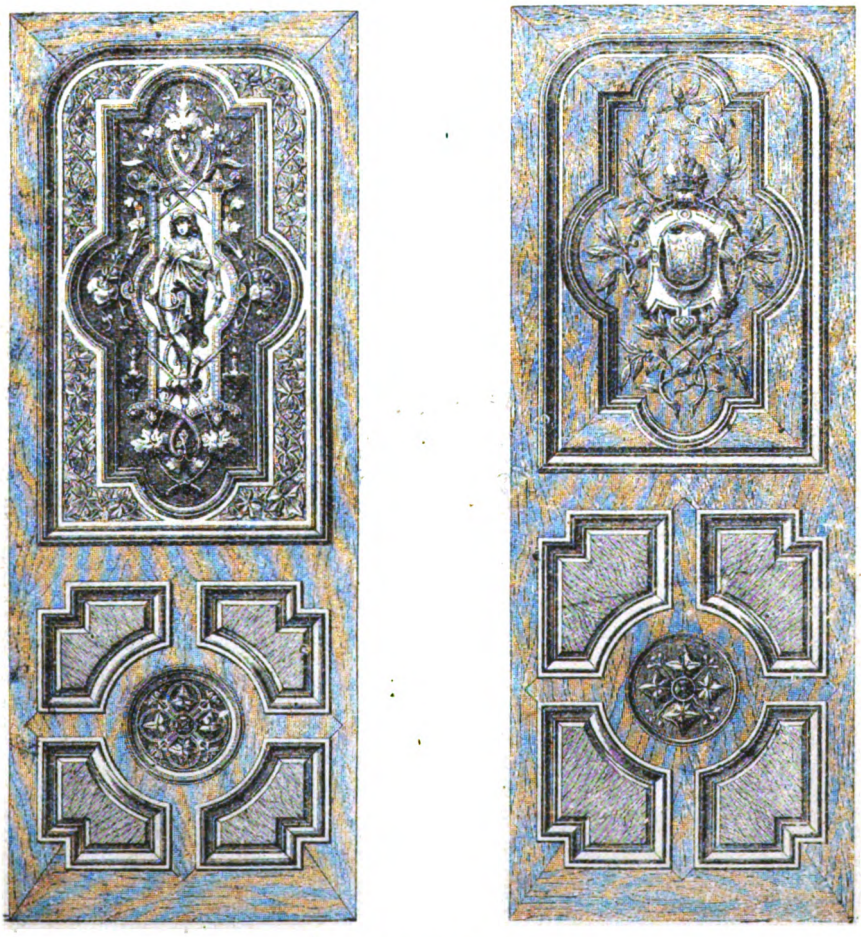
THE ILLUSTRATED WOOD WORKER

FOR JOINERS, CABINET MAKERS, STAIR BUILDERS, CARPENTERS, CAR BUILDERS, &c. &c.

No. 1.—Vol. 1. January, 1879. Price, Ten Cents.



A PAIR OF CARVED DOORS.

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Illustrated Wood-Worker.

TERMS OF SUBSCRIPTION.

One copy monthly, one year, - - - - - $1 00
Four copies, three months to one address, - - 1 00
Single copies, - - - - - - - - - 10

*** The ILLUSTRATED WOOD-WORKER will be sent to any person in the United States or Canada, who desires it, post free, on receipt of the above rates.

OFFICE:

No. 176 Broadway, New York City.

CHAS. D. LAKEY, *Publisher.* FRED. T. HODGSON, *Editor.*

All correspondence intended for the columns of the WOOD-WORKER should be sent to the Editor; but letters of a business nature, or which contain money or Post-Office orders, should be addressed to the Publisher. Rejected communications will not be returned unless the persons sending them remit return postage.

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ILLUSTRATIONS.

A Pair of Carved Doors; Sectorian System of Hand-Railing; Writing-Table; Section of Staircase; Bookcase and Writing-Table; Practical Carpentry; Hips and Bevels; Bookcase and Drawers.

PREFATORY.

THREE hundred thousand workers in wood confess the want of a cheap illustrated journal. This initial number must be taken as an indication of a purpose, not as an average sample of the WOOD-WORKER. If this number is favorably received, we can vouch for those that are to follow.

It is our purpose to cover a wide field. The house-joiner, the car-joiner, the cabinet-maker, and other mechanics who work in wood will always find profitable suggestions in these pages. Every man who feels rich enough to subscribe for this journal, by paying one dollar may depend on getting the full worth of his money. We have ample facilities for obtaining the best examples of modern design, and no pains will be spared in making the WOOD-WORKER worthy of the support it seeks.

The objective point of this journal is the workman, not the employer. We wish this to be distinctly understood at the outset. The WOOD-WORKER is specially and solely for men at the bench. Our purpose is to supply them with material which they turn to profitable use; to help them in learning themselves. This we shall do by giving them new suggestions both in design and construction.

It is well known that new designs are costly. The designer of a new article of furniture, for instance, must be paid not only for the time he expends in thinking out the details of his work, but for the cost of the original drawing. The completed drawing of the pair of doors on our first page probably cost not less than fifty dollars. Consequently all new books of design are beyond the reach of ordinary workmen. Our purpose is to reproduce drawings in the WOOD-WORKER at a merely nominal price that originally cost hundreds of dollars. Indeed it is safe to assure every subscriber that for the sum of one dollar he shall have at the end of a year a collection of choice designs that would have cost him at least fifty dollars in book form. We shall cull from sources new and old the things which strike us as best suited to the wants of the average wood-worker. Because a good thing has been printed and sold at a high price to a few hundred manufacturers, we shall not deem it the less worthy of publication in popular form.

But a glance at the pages of the WOOD-WORKER will show that its mission is not simply to reproduce. Its pages will be enriched with original drawings, prepared especially to meet the wants of its patrons, as will be more evident in the near future.

All regular subscribers to the *American Builder* will receive the WOOD-WORKER free for one year. We trust they will speak a good word for it, and kindly forward subscriptions. We publish an immense edition of this first issue, and hope to have at least 20,000 *bona fide* subscribers before the year is half closed. It will be an easy matter to accomplish this result if our old friends give the new venture a good strong push. Address all business letters to

CHAS. D. LAKEY, Publisher,
176 Broadway, New York City.

To Our Friends.

THIS, the initial number of the WOOD-WORKER, will be sent, postage paid, to many who are not subscribers, in the hope that they may become such.

It is our purpose to make the WOOD-WORKER a lively journal, and one that no wood-working mechanic will not want after seeing and reading a copy, and to publish it at a price that will be within the reach of every workingman.

We intend that nothing new connected with the trades we represent shall escape our notice; and we shall try to present what we

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have to say in language that will be readily understood by the class of men for whom we write. We believe it possible to infuse life and interest into subjects which concern the men who toil for a livelihood with hammer, saw, and plane, and as we labor for the people who work with their hands as well as with their heads, we expect to augment our subscription list to mammoth proportions during the year of 1879.

Our Illustrations.

ON the front page we show two doors with carved work on the panels. These doors are designed so that they can be built and finished without the carved additions, or in place of the elaborate work shown any tasteful design may be substituted.

Plate 2 shows the instruments used in the sectorian system of hand-railing, and is fully explained in another place.

On Plate 3 we show a writing-table—elevation and ground plan. This makes a fine office desk, and is not so elaborate but that any good joiner can make it. It would look very well made of white ash with walnut trimmings.

Plate 4 shows section of staircase with newels, balusters, and doors. It will be noticed that the lower newel is placed one step back, so as to give more room in the hall near the door at the foot of the stairs. This feature is worthy of note, inasmuch as it permits of the lower step being placed very near to the door opening without causing inconvenience.

Plate 5 shows a very handsome bookcase and writing-table combined. The design is excellent, and our readers will find many things about it that are worth imitating; we have reproduced it from the *Workshop*.

Plate 6 is illustrative of the article on practical carpentry, which will be found in another column.

Plate 7 shows a method of obtaining the length and curve of a mansard hip. We are indebted for this plate to our esteemed correspondent "Alonzo."

Plate 8 shows a very neat bookcase, one that can be made by any good joiner or carpenter; this would also make a very convenient kitchen cupboard if shorn of a part of the adornments. It will be noticed that the central part, surmounted by the pediment, projects a few inches from the face of the work.

We shall be pleased to receive drawings, for reproduction, of furniture, joiner's work, special tools and appliances, or any thing of interest, from any of our readers.

Isometric Projection.

THIS is a conventional method of representing an object, in which it has somewhat the appearance of a perspective drawing, with the advantage of the lines situated in the three visible planes at right angles to each other, retaining their exact dimensions. For the representation of such objects, therefore, as have their principal parts in planes at right angles to each other, this kind of projection is particularly well adapted.

Without going into the principles and details of this subject exhaustively here, enough will be explained by illustration to enable the pupil, beginning by imitation of copies, to serve himself sufficiently until he studies the subject fully. The name *isometrical* was given to this method of projection by Professor Farish, of Cambridge, England.

The principle of isometric representation consists in selecting for the plane of the projection one equally inclined to three principal axes, at right angles to each other, so that all straight lines coincident with or parallel to these axes are drawn in projection to the same scale.

The axes are called isometric axes, and all lines parallel to them are called isometric lines. The planes containing the isometric axes are isometric planes; the point in the object projected, assumed as the origin of the axes, is called the regulating point.

(*To be continued.*)

The Sectorian System of Hand-Railing.

AMONG the many systems of hand-railing that have been introduced within the last fifty years, no one is better adapted to the capacity of the average workman than the system invented by the late William Forbes, architect, Richmond, Va., and published by him in 1873 in book form under the title of "The Sectorian System of Hand-Railing." The work was deserving of much more success than it met with at the time of its publication, for it possesses merits that the practical workman would readily appreciate if he was better acquainted with it. It is not claimed that by this system a better rail can be produced than by other systems; but it is claimed that by the sectorian system a stair-rail can be produced, of any size or shape that may be required, in less time, and from less material, than by any method laid down in any work on the subject; and that a knowledge of hand-railing can be acquired in a shorter space of time. This system requires the use of neither gauge nor elliptic curves, no piece or wreath wider in one part than another, and no piece thicker than the width of the rail.

We are pleased to be able to inform our readers that we have made such arrangements with the executors of the late Mr. Forbes as will enable us to publish, during the year, the whole system—text and plates—with such

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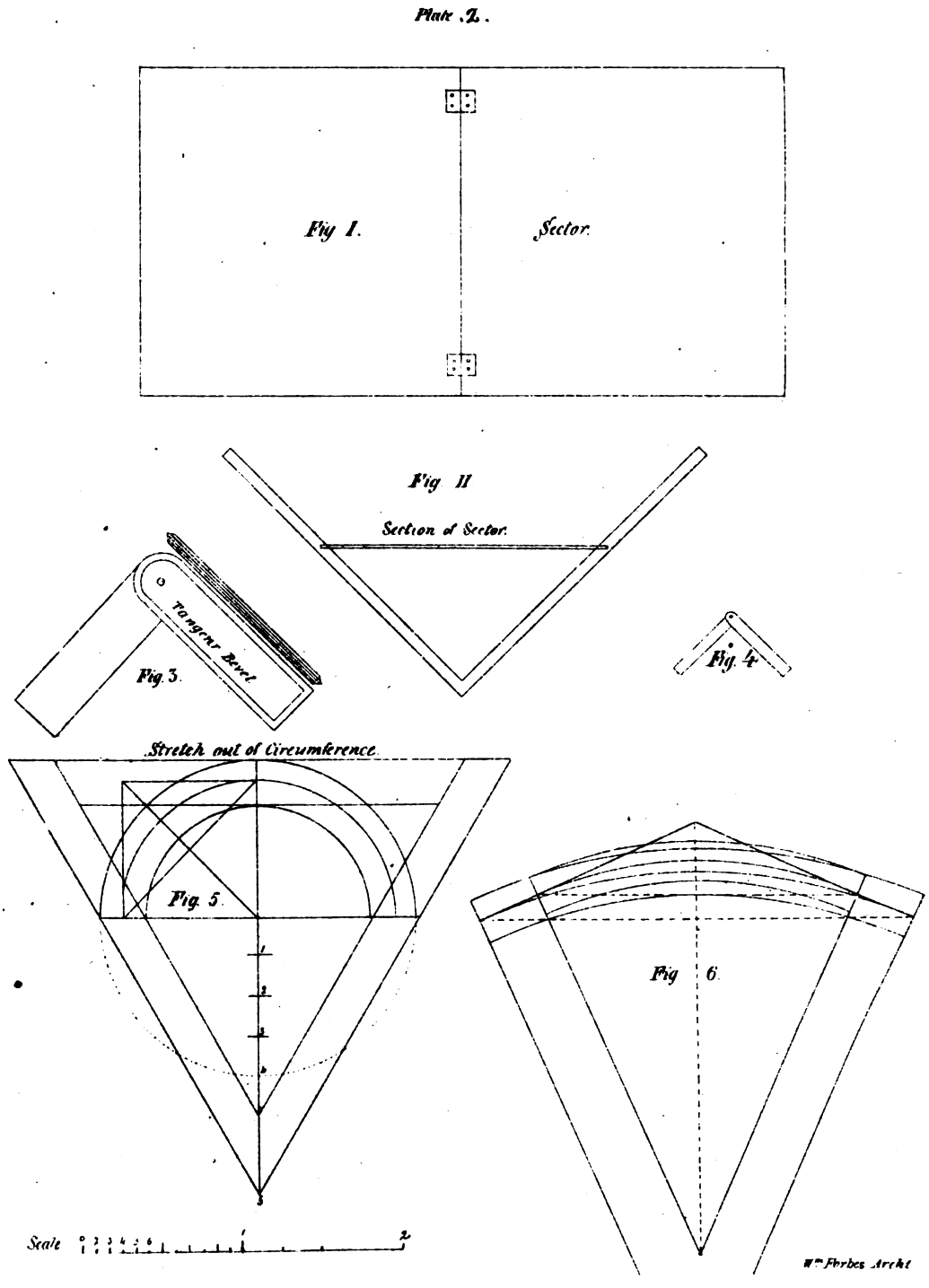
PLATE. 2



THE SECTORIAN SYSTEM OF HAND-RAILING.

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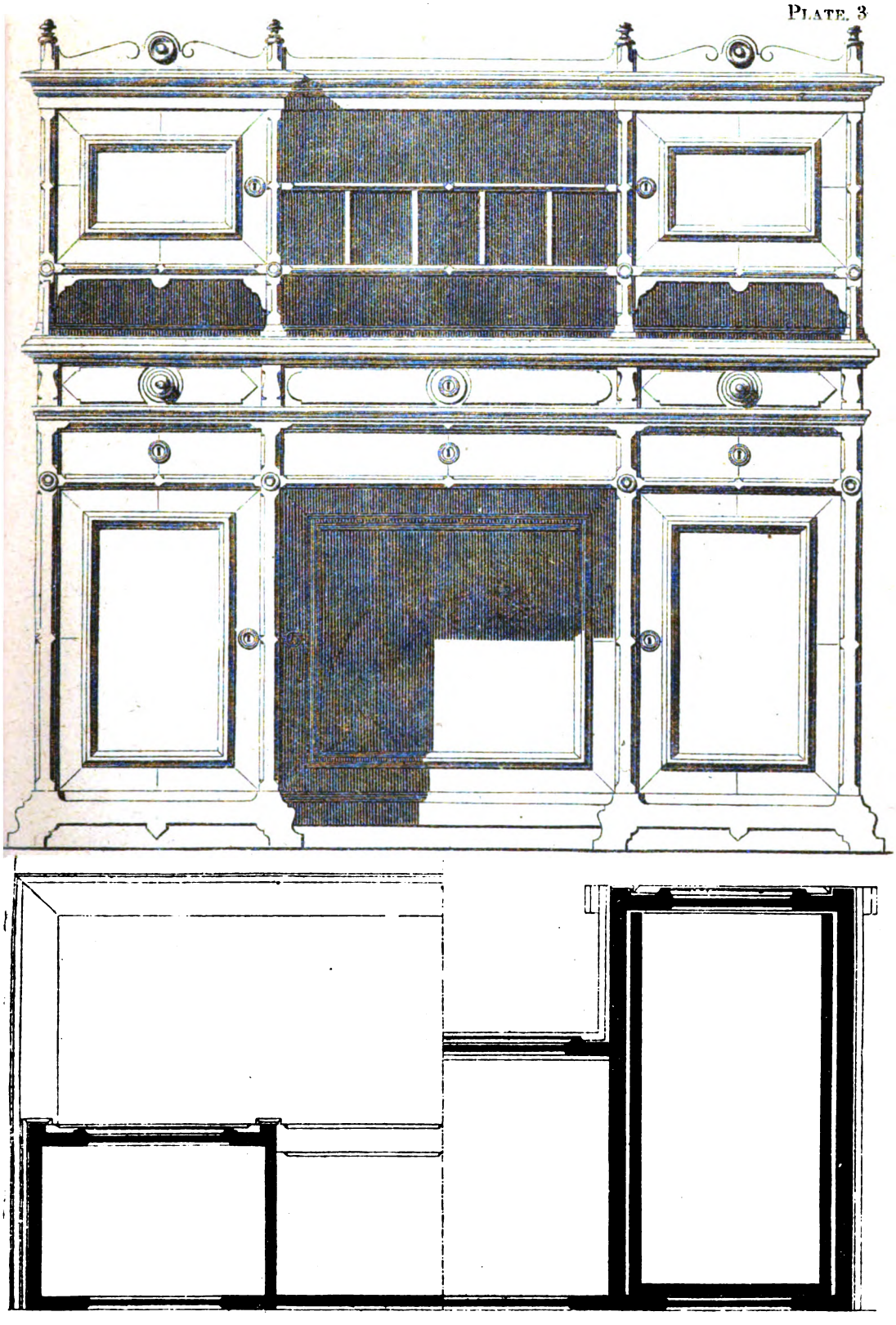
PLATE. 3



WRITING-TABLE, ELEVATION AND GROUND PLAN.

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comments as we may see fit to introduce. To those of our patrons who are not already versed in the mysteries of hand-railing, this announcement should be welcome, as it will place them in a position to obtain a knowledge of the art with the least expenditure of time and money possible; and to those who have acquired a knowledge of the art, this system will be instructive and interesting, inasmuch as it shows them how some of the long-winded problems are cut short by the simple application of two hinged boards.

The chief feature of this system is its extreme simplicity, and we have no hesitation in saying that any one of our readers who will take the trouble to study the text and plates as we publish them, will, at the close of the present volume, be able to build almost any kind of a hand-rail, from a knowledge acquired by such study.

We shall at all times take pleasure in answering any question regarding this system, and hope our readers will not be backward in making known their troubles.

The following is a description of the first plate, where the instruments to be used are shown:

PLATE 2.

Fig. 1 is the sector, on which the system is founded; is made of two boards joined together with hinges, so that the joint on the face will be close in any position; the edges bevelled so as to allow it to fold back to an angle of ninety degrees. Each leaf may be two feet long by one foot wide, with the ends clamped to prevent warping.

Fig. 2 is a section of Fig. 1, showing a brace of wire to keep it in position to any angle.

Fig. 3 is the tangent bevel, used on the face of the sector to obtain tangents.

Fig. 4 is the bevel used on the sector and tangent bevel, and produces the spring and plumb bevels on wreath pieces of rail.

Fig. 5 is the plan of a semicircular piece of wreath. The horizontal lines of the triangles show the stretch-out of the convex and concave edges of the wreath, which is obtained by dividing the radius of the circle into four parts, taking three of them in the dividers and extending to five as shown; then draw lines, cutting chord as shown. The lines of the two triangles are parallel to each other.

Fig. 6 shows the method of obtaining the curve and joints of wreaths after the tangents are drawn from the sector.

By close inspection it will be seen that two lengths are shown—the stars showing the centre line of the curve to each piece. This will be shown to better advantage in succeeding drawings.

Practical Carpentry.

IF we wish to bisect a given angle like Fig. 1, Plate 6, we proceed as follows: Let A B C be the given angle. From the angular point B, with any radius, describe an arc, cutting B A and B C in the points *d* and *e*; also, from the points *d* and *e* as centres, with any radius greater than half the distance between them, describe arcs cutting each other in *f*; through the point of intersection *f*, draw B *f* D; the angle A B C is bisected by the straight line B D; that is, it is divided into two equal angles, A B D and C B D.

Another method is shown on Fig. 2. Let A B C be the given angle, as before. In A B take any two points D and E. On B C set off B F equal to B D, and B G equal to B E; join E F and D G, intersecting each other in H; join also B H, and produce it to any point K; the angle A B C is bisected by the line B K.

To trisect or divide a right angle into three equal angles. Let A B C, Fig. 3, be the given right angle. From the angular point B, with any radius, describe an arc cutting B A and B C in the points *d* and *g*; from the points *d* and *g*, with the radius B *d* or B *g*, describe arcs cutting the arc *d g* in *e* and *f*; join B *e* and B *f*: these lines will trisect the angle A B C, or divide it into three equal angles.

To erect a perpendicular from any point in a straight line proceed as follows: From the point C, Fig. 4, with any radius less than C A or C B, describe arcs cutting the given line A B in *d* and *e*; from these points as centres, with a radius greater than C *d* or C *e*, describe arcs intersecting each other in *f*: join *c f*, and this line will be the perpendicular required.

To erect a perpendicular on the end of a line, take any point *c* in Fig. 5, and with the radius or distance *c* B, describe the portion of the circle *d* B *e*; join *d c*, and extend it to meet the opposite circumference in *e*; draw the line B *e*, which will be the perpendicular sought.

The above can also be found by another method, as follows: From any scale of equal parts, as that represented by the line D, Fig. 6, which contains five, set off from B, on the line A B, the distance B *e*, equal to three of these parts; then from B, with a radius equal to four of the same parts, describe the arc *a b*; also from *e* as a centre, with a radius equal to five parts, describe another arc intersecting the former in C; lastly, join B C; the line B C will be perpendicular to A B. This mode of drawing right angles on paper is more troublesome than the method previously given; but in laying out grounds, fences, or foundations of buildings it is often useful, since only with a ten-"foot" rod the ground fence or building may be set quite square. The method is called the six, eight,

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and ten method, and is demonstrated thus: The square of the hypothenuse, or longest side of a right-angled triangle, being equal to the sum of the squares of the other two sides, the same property must always be inherent in any three numbers, of which the squares of the two lesser numbers added together are equal to the square of the greater. For example, take the numbers six, eight, and ten; the square of six is thirty-six, and the square of eight is sixty-four; and thirty-six and sixty-four added together make one hundred, which is ten times ten, or the square of the greater number. Although these numbers, or any multiple of them, such as three, four, five, or twelve, sixteen, twenty, etc., are the most simple and most easily retained in the memory, yet there are other numbers, very different in proportion, which can be made to serve the same purpose; and for the advanced student we submit the following: Let n denote any number; then $n^2 + 1$, $n^2 - 1$, and $2n$, will represent the hypothenuse, base, and perpendicular of a right-angled triangle. Suppose $n = 6$, then $n^2 + 1 = 37$, $n^2 - 1 = 35$, and $2n = 12$; hence, thirty-seven, thirty-five, and twelve are the sides of a right-angled triangle.

To bisect a given straight line, let A B, Fig. 7, be the given straight line. From the extreme points A and B as centres, with any equal radii greater than half the length of A B, describe arcs cutting each other in C and D: a straight line drawn through the points of intersection C and D will bisect the line A B in *e*.

To divide a given straight line into any number of equal parts. Let A B, Fig. 8, be the given line to be divided into five equal parts. From the point A draw the straight line A C, forming any angle with A B. On the line A C, with any convenient opening of the compasses, set off five equal parts towards C; join the extreme points C B; through the remaining points one, two, three, and four, draw lines parallel to B C, cutting A B in the corresponding points, one, two, three, four: A B will be divided into five equal parts, as required.

To describe an equilateral triangle upon a given straight line. Let A B, Fig. 9, be the given straight line; from the points A and B, with a radius equal to A B, describe arcs intersecting each other in the point C. Join C A and C B, and A B C will be the equilateral triangle required. An eminent mathematician once made the following observation regarding this problem: "It is remarkable that it is not perhaps possible to resolve, without employing the arc of a circle, the very simple problem, and one of the first in the elements of geometry, viz., to describe an equilateral triangle." "We have often attempted it," continues the same author, "but without success, while trying how far we could proceed in geometry by means of straight lines only." He did well to put in the *perhaps*, for the thing happens to be possible after all; but it shows by what trifle the greatest of men will sometimes be baffled. The following is submitted as a method remarkably simple and easy: Let A B, Fig. 10, be the given straight line, it is required to describe an equilateral triangle upon it without making use of the compasses or arcs of a circle. Bisect A B in D, as shown previously, draw A E perpendicular and equal to A D; join D E, and extend D A to F, making A F = D E; join also E F; then from D erect the perpendicular D C = E F, and join A C and C B: A B C will then be an equilateral triangle.

It is easy to see that A C^2 must be 4A D^2; but A C^2 = A D^2 + C D^2 (47th Prop. Euclid), and C D^2 = E F^2 = F A^2 + A E^2 = A E^2 + D E^2; but D E^2 = A D^2 + A E^2 = 2 A D. . . C D^2 = 3 A D^2, and A C = A B^2 = 4 A D^2.

(To be continued.)

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

1. PLANE IRONS.—Why are Butcher's plane irons marked with numbers one, two, three, four, etc.?—A. P. G.

2. PICTURE-FRAMES.—Is it best, in making picture-frames, to glue them at the corners, which is "endwood," or just brad them together?—A. P. G.

3. FILLING.—How can I make a good filling for chestnut and black-walnut?—A. P. G.

4. COMBINATION PLANES.—What firm manufactures the best combination match planes and fillisters of iron in this country; and do these combination planes soon get out of order by frequent changing?—A. P. G.

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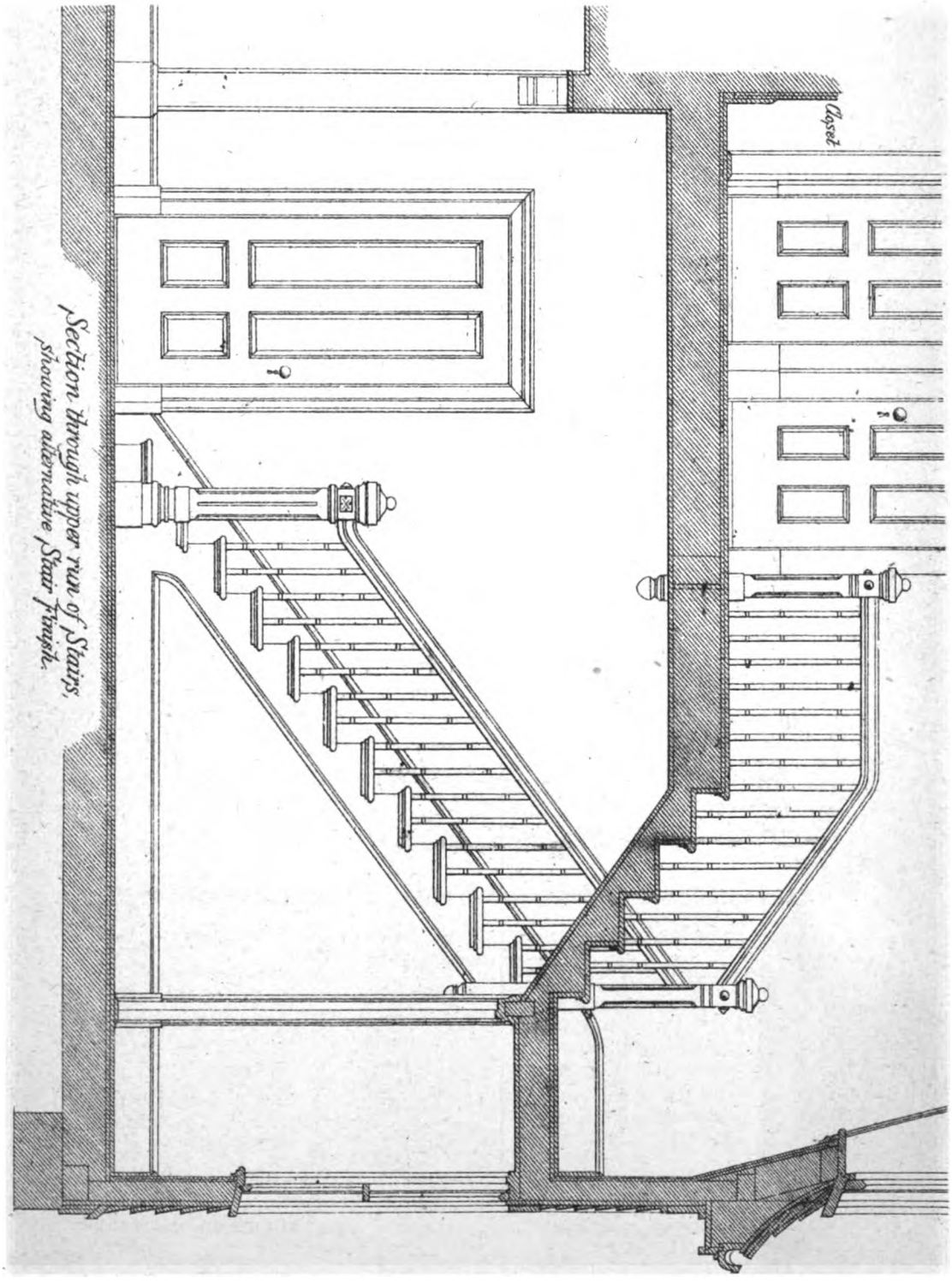
PLATE. 4



SECTION OF STAIRCASE.

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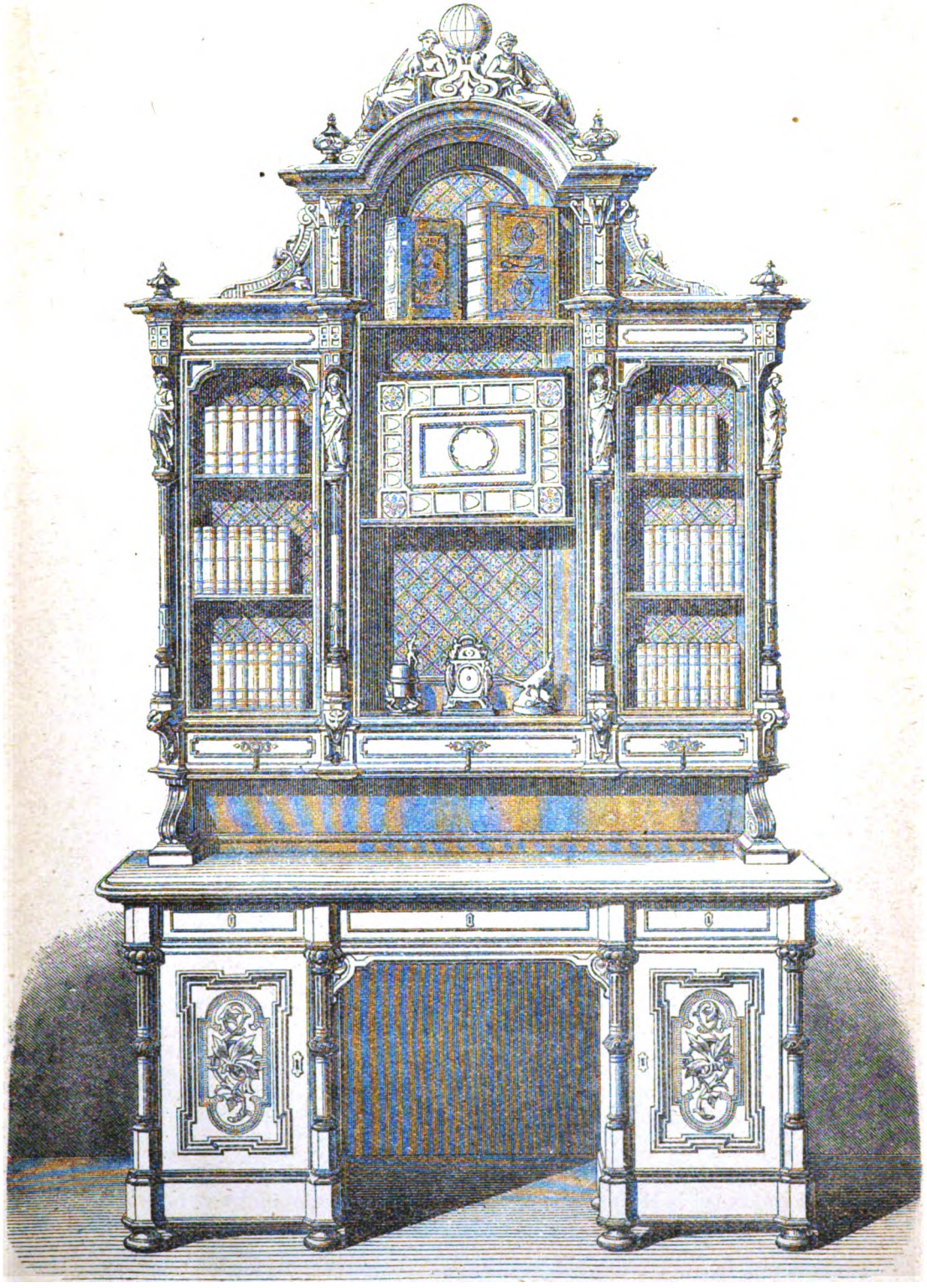
PLATE. 5



BOOK-CASE AND WRITING-TABLE COMBINED.

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5. HARDWOOD PINS.—In pinning frame buildings together, such as barns, bridges, timber roofs, etc., is it better to use dry hickory than that which is green or partly seasoned?—A. P. G.

Correspondence.

Mansard Hips.

To the Editor of the Illustrated Wood-Worker:

Let "A Subscriber" try the following to get the curve of a hip rafter: Fig. 1, Plate 7, is the common rafter, A B the seat, C D the seat of the hip (an angle of 45°). Make as many points on the curve of the common rafter as you like, and from those points drop plumb ordinates cutting C D; transfer C D with all the points thereon to a level line, as C D, Fig. 2, and from those points erect plumb ordinates each of the same length as its corresponding number in Fig. 1, and the points thus found are points on the curve of the hip. This may be old for all I know, but it is good and reliable.

ALONZO.

BOSTON, Nov. 14, 1878.

Technical Education.

IT has become quite the thing of late to write concerning the great necessity that exists for an improvement in the technical education of the masses, and as a result the inquiry is now by no means infrequent, What is technical education? We intend in the present and future issues of this paper to answer this query by giving our readers an opportunity to cull from our pages such information as will convince them as to what is technical education. The plasterer who burns his lime, slakes it, mixes it with sand, and finally makes it into mortar, may thoroughly understand the mechanical processes by which the raw stone is converted into mortar, and, therefore, be a practical "hand" in the manufacture of mortar; but how few plasterers there are that understand the chemical change that takes place in the constituents they employ. Again, the painter possibly knows nothing of the chemical constituents of the various substances he uses, or the reason why such and such effects are produced by the materials he employs. How much better workman he would be if possessed of that knowledge, must be evident to the least observant. A knowledge of the "why," in every branch of trade, would be of immense service to all concerned in the work, and the superior intelligence of the workman would most assuredly enhance the value of the work produced, as it would bear the impress of superior skill and workmanship, and increase his value as a workman.

Chemistry, mining, geology—science and art—should go out together into all our cities, towns, and hamlets, assisted by government subsidies. No money could be better spent, for technical education would then become general, workmen more valuable, foreign competition from any point reduced to a minimum, the "level" of wages would become an obsolete phrase, and the chances of strikes all but impossible. It would also soon be observed that "waste" in all trades would be greatly reduced in quantity; and thus for the expenditure of a few thousands a year, for say the next ten years, there would ensue to the nation a gain of millions. This would be a casting of the bread on the waters productive of a safe return.

No doubt the stimulus given to the study of art and science since the Centennial Exhibition has been productive of immense material results; it may safely be asserted that the spreading of the knowledge of chemistry, geology, and mechanics amongst the working and the growing youth of the population would be twenty times more productive.

Something should be done in this direction before long, and we hope that our legislators will lay aside their political squabbles for a time, and wrestle with something that will be of real and lasting good to the nation. It is all very well to tell the workman that he possesses the franchise, and should therefore rest content; politically, this is but a poor substitute for the strength and blessings that education bestows.

House-Planning.

IF persons who are about to have houses erected, either for their own use or for the use of their tenants, would give the subject as much thought as they would expend on any other equally important subject, there would be fewer badly constructed and ill-devised than there now are. Each family, for organic and numeral reasons, requires a house different and distinct in appointment and character from that of any of its neighbors. It is quite true that families, different in characteristics, may live and enjoy a certain amount of comfort in similarly constructed and appointed houses, but this apparent enjoyment is obtained at the expense of overwork or inconvenience of some one or more of the members of the household. When the houses are rented, this overwork or inconvenience cannot well be avoided, but it may be mitigated by a little foresight and ingenuity on the part of the members; but, in a new house, built for the persons who are

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to occupy it, and subject to their will, there can be no excuse for incongruity of arrangement or inconvenience of appointment.

It is the duty of the head of the household, when preparing to build, to take into consideration the tastes, peculiarities, and requirements of each member, and shape his building to suit these various conditions, always making provision for the natural and inevitable changes which are likely to take place in his family. For, if he does his whole duty, he is not to forget that it is his interest to study the convenience and welfare of his "help," both male and female; for it must always be understood that the monarch of the kitchen holds the health of the inmates of the house in his or her hand; it must be obvious, then, that it is of paramount importance to furnish this culinary potentate with all the required improvements of the age, and to remove as far as possible every inconvenient and irritating condition from his domain. Hired "help" of every kind increases in value and efficiency as its surroundings increase in taste and convenience, and the custom of locating the kitchen in the most inconvenient and inaccessible part of the house, and relegating the "help" to sleeping-rooms over furnaces, ranges, or sky-high garrets, is pernicious and unwise, and must in the nature of things result in loss of service, irritation, and dissatisfaction to all concerned, though the source of trouble may oftentimes not be known or recognized.

After the plan and appointments have been fairly considered and discussed by the whole household, a sketch may be prepared by the prospective owner, which may be again submitted to the family council, and such alteration, changes, or additions made as the combined wisdom of the council may see fit; when the whole may then be handed in to an architect of experience, who will be able to give such further hints and suggestions regarding the plan that may prove acceptable and of value.

Having reached this stage, the balance may safely be left with the architect, whose duty it will be to harmonize the whole work, and give each idea a tangible shape, and so place every thing shown in the sketch in order, and in accordance with accustomed usage.

To Cut Glass without a Diamond.

CARPENTERS, joiners, and cabinet-makers are frequently called upon to fit glass to frames or sashes where no glass has been prepared to suit; under such circumstances it would be well to know how to cut glass to answer their purposes, without the aid of a diamond. Many persons may not be aware that glass can be cut under water with great ease, to almost any shape, by simply using a pair of shears or strong scissors. In order to insure success, two points must be attended to: first, and most important, the glass must be kept quite level in the water while the scissors are applied; and secondly, to avoid risk, it is better to begin the cutting by taking off small pieces at the corners and along the edges, and so reduce the shape gradually to that required, as if any attempt is made to cut the glass all at once to the shape, as we should cut a piece of card-board, it will most likely break just where it is not wanted. Some kinds of glass cut much better than others, the softer glasses being the best for this purpose. The scissors need not be at all sharp, as their action does not appear to depend on the state of the edge presented to the glass. When the operation goes on well, the glass breaks away from the scissors in small pieces in a straight line with the blades. This method of cutting glass has often been of service, when a diamond has not been at hand, for cutting ovals and segments, and though the edges are not so smooth as might be desired for some purposes, yet it will answer in a great many cases. The two hints given above, if strictly followed, will always insure success.

Workshop Management.

FREDERICK SMITH, an Englishman, has written a book on this subject, in which he makes the following among other points, as described in a review. Not every one who owns or has charge of a workship knows, or cares to know, upon what principles it should be conducted in order that success may accrue. Indeed, we do not hesitate to say that the incompetents are largely in the majority. Too often proprietors, so that they get an income which means a handsome interest on capital invested, an easy life, and some dignity, do not trouble themselves to inquire closely how the details of their business are being carried out; and as a result petty tyranny often flourishes, and frequently dissimulation and dishonest practices grow apace. The teaching that employers owe to their workpeople, the duty of watching their condition, is not sufficiently recognized, and the consequences are found in diffidence and contentions. Now, to ignore this duty is unwise as well as improper, for where the employer evinces little or no interest in his people—is rarely seen by them, and more rarely heard as counsellor—the belief forces itself that there exists indifference and selfishness, and corresponding qualities spring up on the other side. Demoralization is then rapid. "Give the least you can for the most you can get" becomes a guiding principle. What follows is depreciation of profits, and where drastic remedies are not applied, crip-

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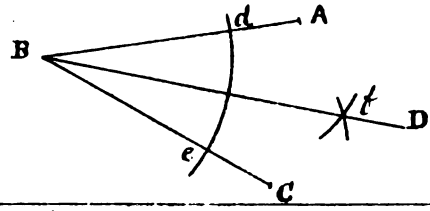
PLATE. 6

Fig. 1



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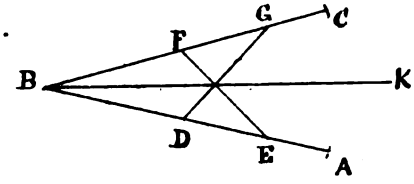

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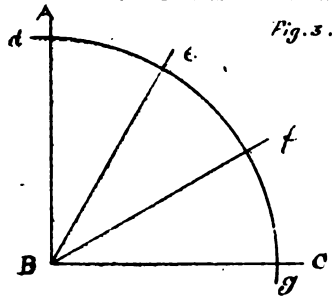

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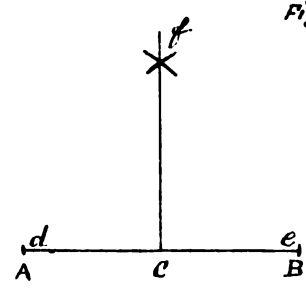

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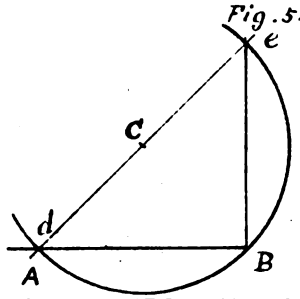

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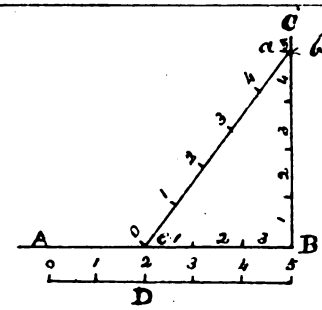

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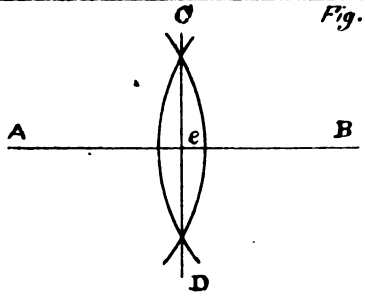

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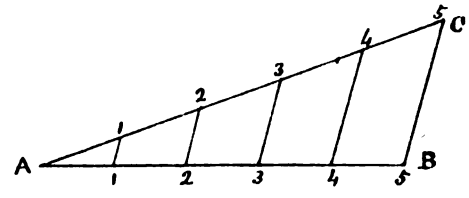

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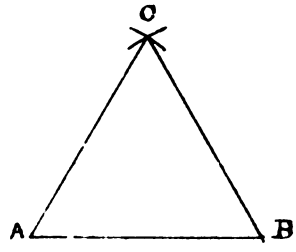

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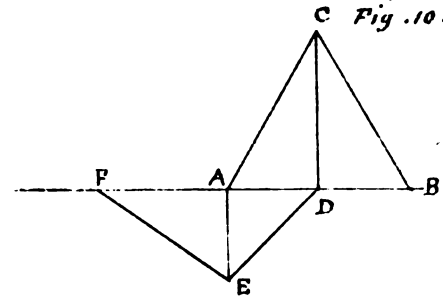

PRACTICAL CARPENTRY.

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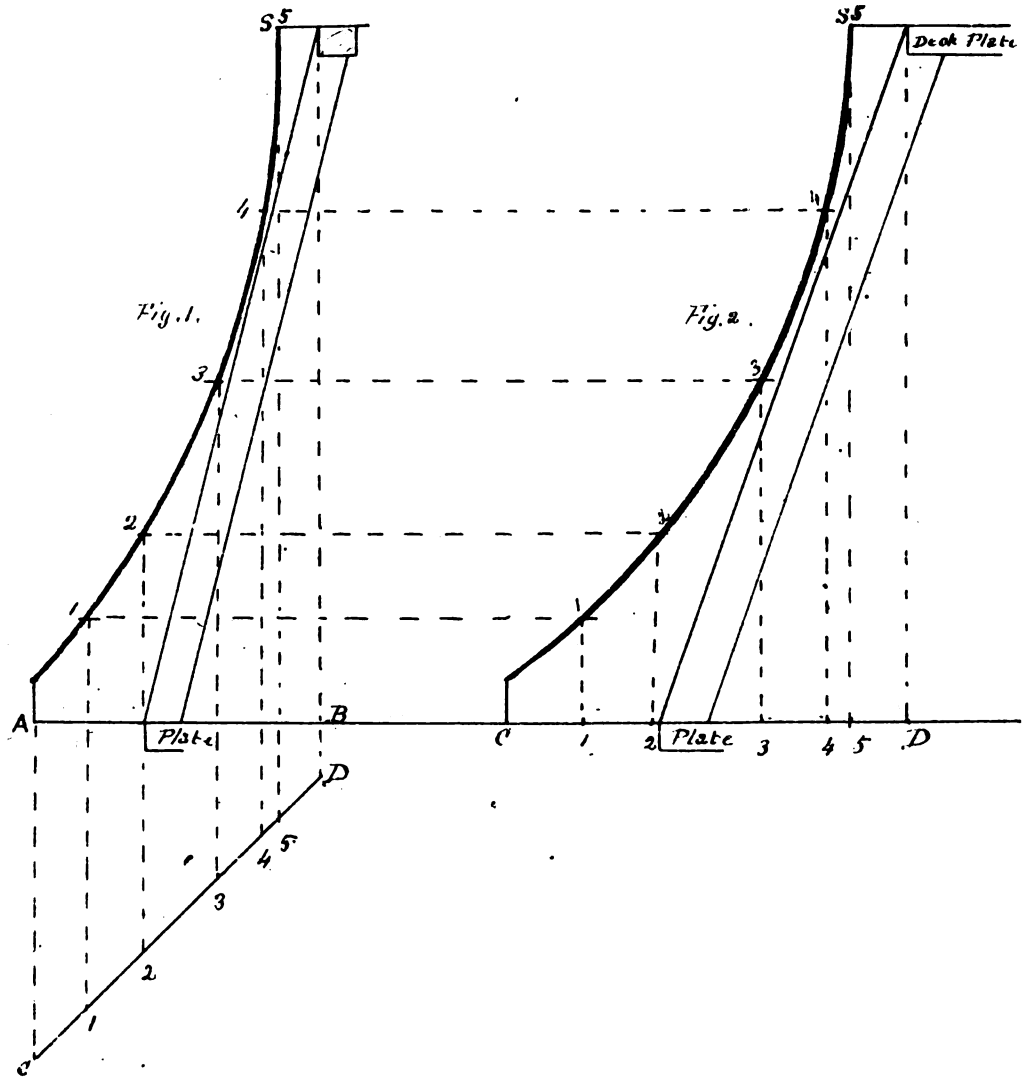
PLATE. 7



BEVEL AND CURVE OF HIP RAFTERS.

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pling embarrassment often rears its head. If employers, then, desire the maximum of benefit from their business, among other things their knowledge of their workshops should be intimate and their interest in the laborers in them active. To the advocacy of this, much of Mr. Smith's book is devoted. But the author also finds ample opportunity for scathing condemnation of unworthy foremen, who connive at dishonest practices, and, by showing they have no self-respect, set the example of impropriety to those whom they are intrusted with the care and guidance of. The capable foreman and his qualities are, of course, likewise considered. He should be honest, honorable, respecting and respected, with his conscience ever for his guide, and intelligent enough to exercise his brains when difficulties present. Of course there are very few such; but only such are fitted for the position; and an employer who lacks the foresight enabling him to detect such qualities is minus a power he can ill spare.

Note on "Blowing Off" Steam Boilers.

IN a French essay on the care of steam boilers, we find a note on the advantage of cooling off the arch after stopping and before "blowing off." It is as follows: Those who possess externally-fired boilers working only by day have all observed that the fire being covered at night, and the doors closed, the pressure rises during the night, often sufficiently to open the valves. This shows that the masonry, being at a much higher temperature than the boiler which it envelopes, imparts to it some of its heat. The same effect of heating the boilers by the masonry is produced to a less degree, it is true, but, nevertheless, to some extent, on the outer jacket of internally-fired boilers. It is consequently injurious to empty boilers soon after having stopped them, because after emptying, the plates would be heated by the action of the masonry. It is well to admit a current of air through the flue some hours after the stoppage of the generator, and not to empty it before the flues have become cooled to a temperature below 150°. When the flues are not too hot, no serious inconvenience is experienced in emptying the boiler under pressure. We do not say at high pressure, as for a boiler the pressure of which would be 5 kilogs., the temperature of the water being 152°, a great quantity of steam would be generated during the process of emptying; we think that at a pressure at one kilog. the boiler could very well be emptied. In internally-fired boilers, as there is no masonry to cool in the furnace tubes, it would be preferable to admit the current of air intended to cool the masonry behind the boiler, as in this case the furnaces would not be cooled more rapidly than the jacket. We have sometimes seen owners empty their boilers almost immediately after the fires have been extinguished, clean them with cold water as soon as they were empty, and keep up a current of water so that the workmen might work there. Boilers of small dimensions sometimes resist this treatment, but in large boilers it will be seen that unequal contractions must take place which burst the rivets.

An Auger which Bores Square Holes.

To send a verdant youngster in search of a drill wherewith to make a square hole, is one of those time-honored workshop jokes, the freshness and originality of which is perennial with succeeding generations of perpetrators. But the laugh is now over, or at least it is on the side of the victim, for, incredible as it may appear, this apparent impossibility has been accomplished, and in a way so simple and so easy that any one may prove the fact for himself. As may be supposed, the invention has excited more genuine astonishment among the mechanics gathered at the Exposition than any of the other wonders here displayed. There is a constant crowd surrounding the inventor, watching him bore hole after hole square, and puzzling over the very simplicity of the provokingly simple solution of the problem. If I had not seen the thing done, I should have refused, as many of your readers will doubtless feel similarly inclined to do, to believe in its possibility; but, fortunately, here is a case where nothing need be taken on faith. All that is required is an ordinary hand drill-stock. A stationary one with a chuck below for holding the work, the inventor, Mr. Julius Hall, of London, uses; but he says a common brace will answer—"any thing, in fact, will do that can properly hold the drill." The tool itself is the usual form of three-square drill, so that it will be seen that no special apparatus at all is required. Clamp or chuck this drill in its holder, so that it "will wobble," and you have the whole secret. Instead of making a round hole, as it undoubtedly will if tightly grasped, when loosely held it produces a square one. Why it should act thus is at first, to all appearances, an impenetrable paradox; and even after the *rationale* is discovered, it scarcely seems quite clear.

Rosewood.

ROSEWOOD has always been considered an aristocratic wood. It is used for fine furniture and pianos by all civilized nations. We have no record of its first introduction into use, but it is fair to presume that it was soon after the discovery of South America,

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as old writers speak of rosewood cabinets and other articles of furniture. It is found only in South America, although a very near approach to it is used by the Chinese, of which and bamboo they construct all their furniture. The French call it *palaisandre. Bois de rose*, or wood of the rose, is an African wood, and is red, with yellow streaks. It seldom grows over eight inches in diameter, and is cut into veneers and used bias for borders in inlaid or marquetry work. Rosewood, or *palaisandre*, is found of superior quality in Brazil. Rio de Janeiro exports all of the fine quality of wood. Large quantities of inferior quality are sent from Bahia, but this wood is only used by cheap manufacturers, as the grain is a dull brown, and possesses but little beauty of figure. Honduras also exports a heavy, dull-looking rosewood, which is mostly consumed for drumsticks and canes. Rio Janeiro wood grows large, and the wood is beautifully variegated. The most desirable wood, that which is the most mottled, is selected for veneers, and the plain, straight-grained logs, when brought to market, are very rough and gnarled. It has latterly been sold by weight only; some years ago it was sold by the log, and the purchaser relied on his acuteness for bargains. It contains an acrid oil, which must be extracted by steaming, or by long exposure to the air, before it can be relied on to hold with glue. It has a pungent smell, and the men who work in it seem to imbibe the odor into their system, as no ablution will eradicate the smell by which the worker is distinguished from the worker of other woods. The dust arising from sand-papering is not poisonous, although it gives a peculiarly ghastly expression to the workman's countenance. Rosewood, if well worked, is the most durable of all furniture-wood, and after a century's use it can be polished to look as well as new. It is exceedingly strong and hard, and becomes more solid from age.

Useful Items for Office and Shop.

A GOOD paste made by mixing powdered glass with a concentrated solution of silicate of soda is recommended as a good acid-proof cement.

A GOOD way to ebonize flat surfaces of soft wood is to rub very fine charcoal dust into the pores with oil. This works well with linden and other white woods.

TO STAIN WOOD BLACK.—Drop a little sulphuric acid into a small quantity of water; brush over the wood, and hold it to the fire. It will be a good black and take a fine polish.

A STRANGE substitute for lightning-conductors has been tried at Tarbes, in the department of Hautes-Pyrénées. Bundles of straw have been fixed upon the roofs, attached to broomsticks in a vertical position. Since their introduction there have been no accidents from lightning in the district.

WOOD PULLEYS.—For the purpose of hardening wooden pulleys, the pulley, after it is turned and rubbed smooth, is boiled for about eight minutes in olive oil. It is then allowed to dry, when it will become exceedingly hard.

FRENCH POLISHES.—1. Naphtha polish. Shel-lac, three pounds; wood naphtha, three quarts; dissolve.—2. Spirit polish. Shel-lac, two pounds; powdered mastic, sandarac, of each one ounce; copal varnish, one half pint; spirits of wine, one gallon; digest in the cold till dissolved.

SCHEDULE OF DAILY WAGES.

(Revised monthly.)

LOCALITIES.	TRADES.						
	Laborer.	Carpenter.	Stair-Builder.	Joiner.	Cabinet-Maker.	Finisher.	Painter.
	$	$	$	$	$	$	$
New York	1 25 @ 2 25	2 50 @ 2 75	2 25 @ 2 75	2 25 @ 2 50	1 50 @ 3 00	1 50 @ 3 00	1 50 @ 2 00
Boston	1 00 @ 1 50	1 50 @ 2 25	2 00 @ 2 25	1 50 @ 2 00	1 50 @ 2 50	.....	1 75 @ 2 25
Baltimore	1 00 @ 1 60	1 25 @ 2 75	2 25 @ 3 00	2 50 @ 3 25	2 50 @ 3 25	2 00 @ 2 75	1 50 @ 2 50
Philadelphia	1 10 @ 1 60	1 50 @ 2 25	2 50 @	.....	....	.....	2 00 @ 2 50
St. Louis	1 00 @ 2 10	1 50 @ 2 00	1 50 @ 3 00	.....	.....	1 50 @ 2 10	2 00 @ 2 50
Chicago	1 00 @ 1 25	1 25 @ 2 00	2 00 @ 3 00	1 75 @ 2 50	1 75 @ 2 50	1 50 @ 2 10	1 75 @ 2 25
Cincinnati	1 00 @ 1 50	1 75 @ 2 25	1 75 @ 2 50	.....	.....	....	1 75 @ 2 00
San Francisco	2 00 @ 3 00	3 00 @ 4 00	.....	.....	.....	.....	.....
Texas	1 75 @ 2 00	2 50 @ 3 25	.....	2 00 @ 3 00	2 00 @ 3 00	.....	.....
Ottawa (Canada)	80 @ 1 10	1 25 @ 2 00	1 75 @ 2 50	1 50 @ 2 00	1 50 @ 2 00	1 00 @ 1 75	1 00 @ 1 75
Toronto (Canada)	1 00 @ 1 25	1 25 @ 2 25	2 00 @ 3 00	1 50 @ 2 25	1 50 @ 2 25	1 00 @ 2 00	1 00 @ 2 00

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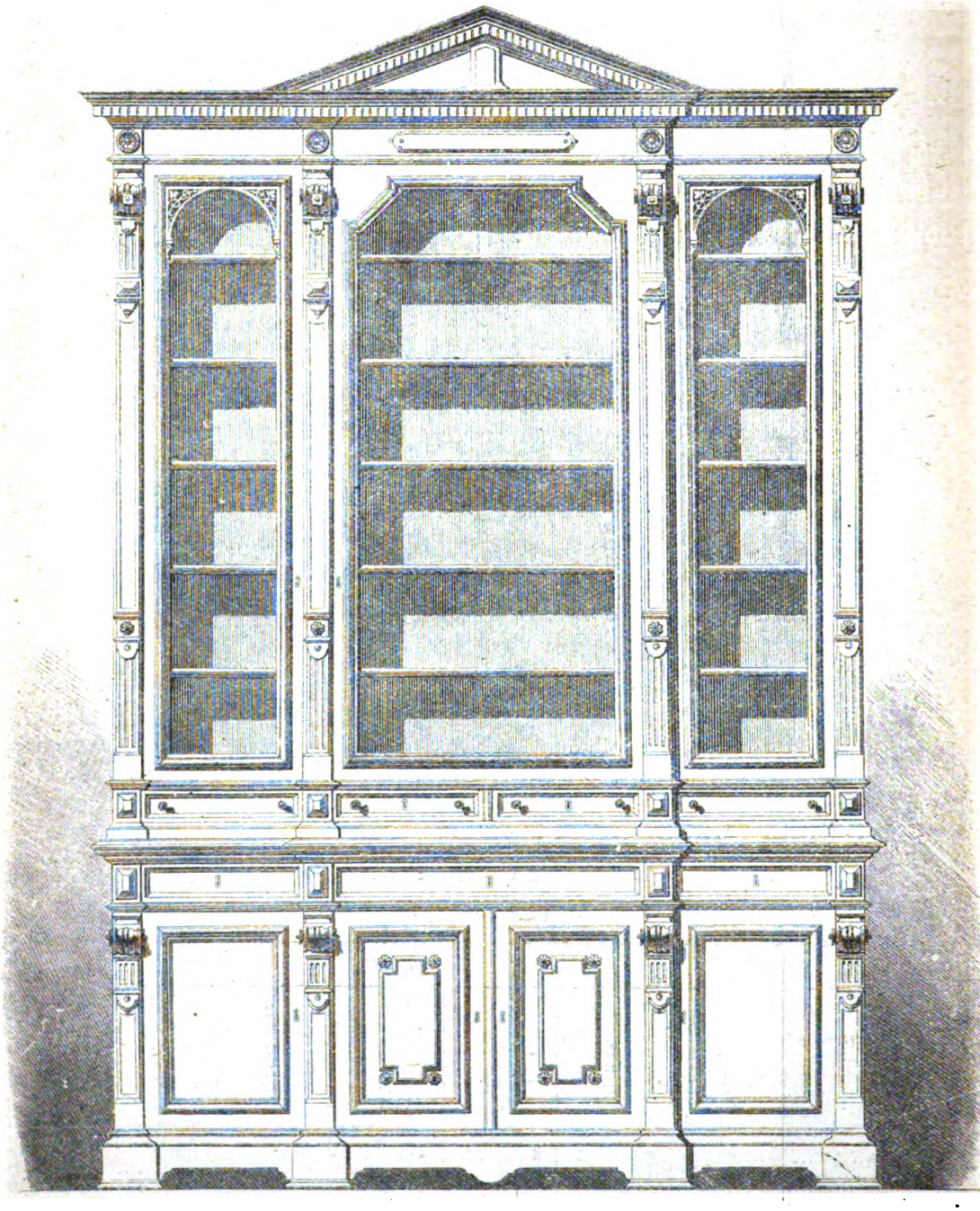
PLATE. 8



BOOK-CASE, WITH DRAWERS AND SOLID DOORS.

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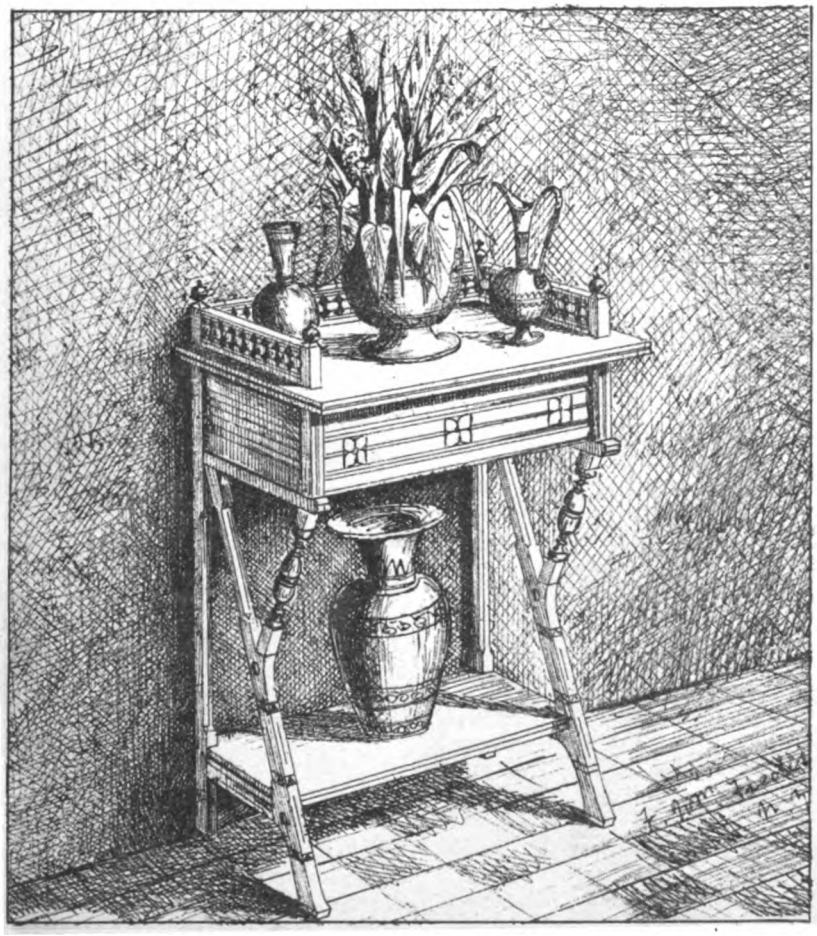
THE ILLUSTRATED
WOOD WORKER
FOR JOINERS CABINET MAKERS STAIR BUILDERS CARPENTERS CAR BUILDERS &c. &c.

VOL. 1 NO. 2 FEBRUARY, 1879. PRICE, TEN CENTS.



WALL TABLE.

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Illustrated Wood-Worker.

TERMS OF SUBSCRIPTION.

One copy monthly, one year,	$1 00
Four copies, three months to one address,	1 00
Single copies,	10

*** The ILLUSTRATED WOOD-WORKER will be sent to any person in the United States or Canada, who desires it, post free, on receipt of the above rates.

OFFICE:

No. 176 Broadway, New York City.

CHAS. D. LAKEY, *Publisher.* FRED. T. HODGSON, *Editor.*

All correspondence intended for the columns of the WOOD-WORKER should be sent to the Editor; but letters of a business nature, or which contain money or Post-Office orders, should be addressed to the Publisher. Rejected communications will not be returned unless the persons sending them remit return postage.

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ILLUSTRATIONS.

Plate 9, Design for Wall-Table; Plate 10, Hand-Railing; Plate 11, Mantel and Cabinet; Plate 12, Design for Sideboard; Plate 13, Cottage Queen Anne Style; Plate 14, Practical Carpentry; Plate 15, Isometric Projection; Plate 16, Working-man's Cottage.

Our Illustrations.

THE wall-table shown on the front page is a little gem in its way, and is suggestive of strength and adaptability; it is designed in the "Queen Anne style," and is reproduced from an original drawing by F. Wm. Fieder. If made in oak or other domestic wood, it would have a very unique and pleasing appearance. The construction is such that any intelligent cabinet-maker or joiner will be able to understand at a glance.

Plate 10 shows the method of obtaining the lines for hand-rail for a platform stair, by the "Sectorian System of Hand-Railing." A full explanation of this plate will be found in another column.

Plate 11 is an original design by Mr. Fieder of a mantel and cabinet. The cabinet will concern our readers more than the mantel. It will be noticed that in the back of the lower part of the cabinet is a mirror in an appropriate frame. The angular shelves on each side will strike the workman as being novel, and at the same time useful. This piece of furniture would look well if made in walnut and finished in oil; but of course the other furniture in the room would have a good deal to do in determining the kind of wood to use for its construction.

Plate 12 shows a handsome dining-room sideboard in the "Eastlake style," which was also designed by Mr. Fieder. This sideboard would look well in any natural wood, and is so constructed that any good workman can make it. Joiners or cabinet-makers who have any spare time on their hands could easily make a sideboard like this; and we are sure, if the work is neatly done, and good material used, that it would find a ready sale, for this style of furniture is now in great demand all over the country.

Plate 13.—This plate shows a cottage, which is a very fine specimen in the "Queen Anne style." The method of construction is obvious. We are indebted to Mr. Kuhns, architect, of Philadelphia, for this drawing. Its estimated cost is $3000, finished in natural woods. The roofs and sides of building, where shown, are covered with slates. We are sure the readers of the WOOD-WORKER will find much in the design to admire and appreciate. We hope to be favored with more illustrations from the same hand.

Plate 14.—This plate is illustrative of the articles on PRACTICAL CARPENTRY that are published in another part of the WOOD-WORKER.

Plate 15 shows a method of dealing with a cube isometrically. Full explanations are given elsewhere.

Plate 16.—On this plate the elevation and plan of a working-man's cottage is shown. The drawing is furnished us by James N. Stuart, New London, Conn., who also furnishes us with the following description: "The house is to be 22 x 28 feet on the ground, with 14 feet posts. First story, 9 feet in the clear. Two chimneys will be started from the cellar bottom, and brought together in the attic, and topped off on the roof as one, keeping the flues separate all the way up. The first story will be finished as shown on plan, with inclosed shelf in pantry. The attic will contain two bedrooms and as many clothes closets. Total cost of building completed, including foundation, $700.

Familiar Talk.

WE do like to have a quiet chat with the men who use the plane, the saw, the adze, chisel, square, and glue-pot; it seems like old times, for we wish all the readers of the WOOD-WORKER to know that for thirty years we earned our bread by the use of the tools mentioned above, and this fact brings us in

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closer affinity with the men we are now addressing. We think, from our long acquaintance with their habits, necessities, and conditions, that we know the wants, rights, and troubles of the mechanics of this country, and we are sure, from actual experience, that we know of many disadvantages, educational and otherwise, under which they suffer, and which by concerted action might be removed, to the great benefit of the operative artisan; but more of this anon. We think our friends will notice an improvement in the general "get up" of the WOOD-WORKER for the present month, and we can assure them that future numbers will improve proportionately, as we are making arrangements for a good supply of new and original designs.

WE desire to call special attention to the designs contributed in this issue of the WOOD-WORKER by Mr. Fieder. Mr. Fieder is an artist whose reputation is by no means confined to this country, although he is an American by birth. In drawing he is a master of light and shade, and the freedom of his work arises from the fact that it is almost purely free-hand. There is a grace and elasticity of touch about it that will, we are sure, awaken an interest among young draughtsmen, and start many of them toward better ways of doing things. Mr. Fieder seems to have the knack of investing simple things, things easy of construction, with the true art idea, and we shall be greatly disappointed if the patrons of the WOOD-WORKER fail in fully appreciating him. Arrangements can be made with Mr. Fieder for large details of his work, if required, by addressing him at this office.

OWING to the late unfavorable weather the building trades have almost come to a standstill, though the sash and blind factories and furniture establishments are moderately employed. Permits to build and repair were granted last month in this city, which, if proceeded with, will cost in the aggregate $950,000. The car-building generally is rather flat. In the West and South the car shops have not done much since the holidays. Trade is unsteady in the Eastern and Middle States.

Practical Carpentry.

FIG. 1 plate is called a lancet arch. It is composed of two curves meeting in a point at the top, and joining a straight line at each side in such a manner that the two straight lines are parallel to each other and tangent to each curve, and that every portion of the two curves terminated by equal chords from their point of meeting are equal and similar arcs. The manner of describing Fig. 1 is obvious.

Fig. 2 is what is commonly denominated an oval. An oval, generally speaking, is an oblong figure formed by a curve line which returns to itself. From this definition of an oval it is evident that there may be an infinite variety of curves so called. To describe the oval Fig. 2, draw the line P K, equal in length to the longest diameter of the figure, and bisect P K by a perpendicular H L, cutting it in *p*; make *p* H and *p* L each equal to half the breadth of the figure; then describe the circle, or the arc of a circle, F G H, in such a manner that the centre may be in the line H L, or in H L produced, and that the circumference may not cut the line P K, but may fall as much without as may be thought proper, and draw A B perpendicular to P K; the manner of completing the curve is then obvious.

Fig. 3 is another form of the lancet arch, supposed to have the same properties as that already defined; but here the angle G P I at the vertex is given. It must, however, always be greater than the angle formed by the lines extending from each extremity of the chord R H to the summit P. Draw P *c* perpendicular to P G, and let R be the point which divides the arch from the straight line on one side, or what is denominated one of the spring points of the arch, and let R H meet the tangent R E in R, then half of the arch can be described as shown.

Fig. 4 is another oval having the same properties as that which stands above it. To prepare this figure draw the straight line R H equal to the length of the oval. Bisect R H by the perpendicular P K, then set off half the width on each side of the centre, and the remote extremities P and K are the extremities of the width. In order that this oval may be a tolerably good representation of the mathematical curve called an ellipse, divide the difference between half the length and half the width into two equal parts, and set three from the centre upon the line R H on each side of it to *b* and *i*; then describe two arcs that shall meet each other in the line of their centres, and that shall touch a straight line D P in P, and E R in R, and that the arc belonging to the lesser circle shall have a given radius. Having finished one end the other will be described in the same manner, and the remaining side by the same radius as the first side opposite.

Fig. 5 is a semi-oval, drawn in the same manner as the figure above it. The curves of the three figures at the bottom of the plate are each composed of two circular arcs.

Fig. 6 is an imitation of a section of a Grecian ovolo.

Figs. 7 and 8 are in imitation of the section of a scotia. In both these figures the

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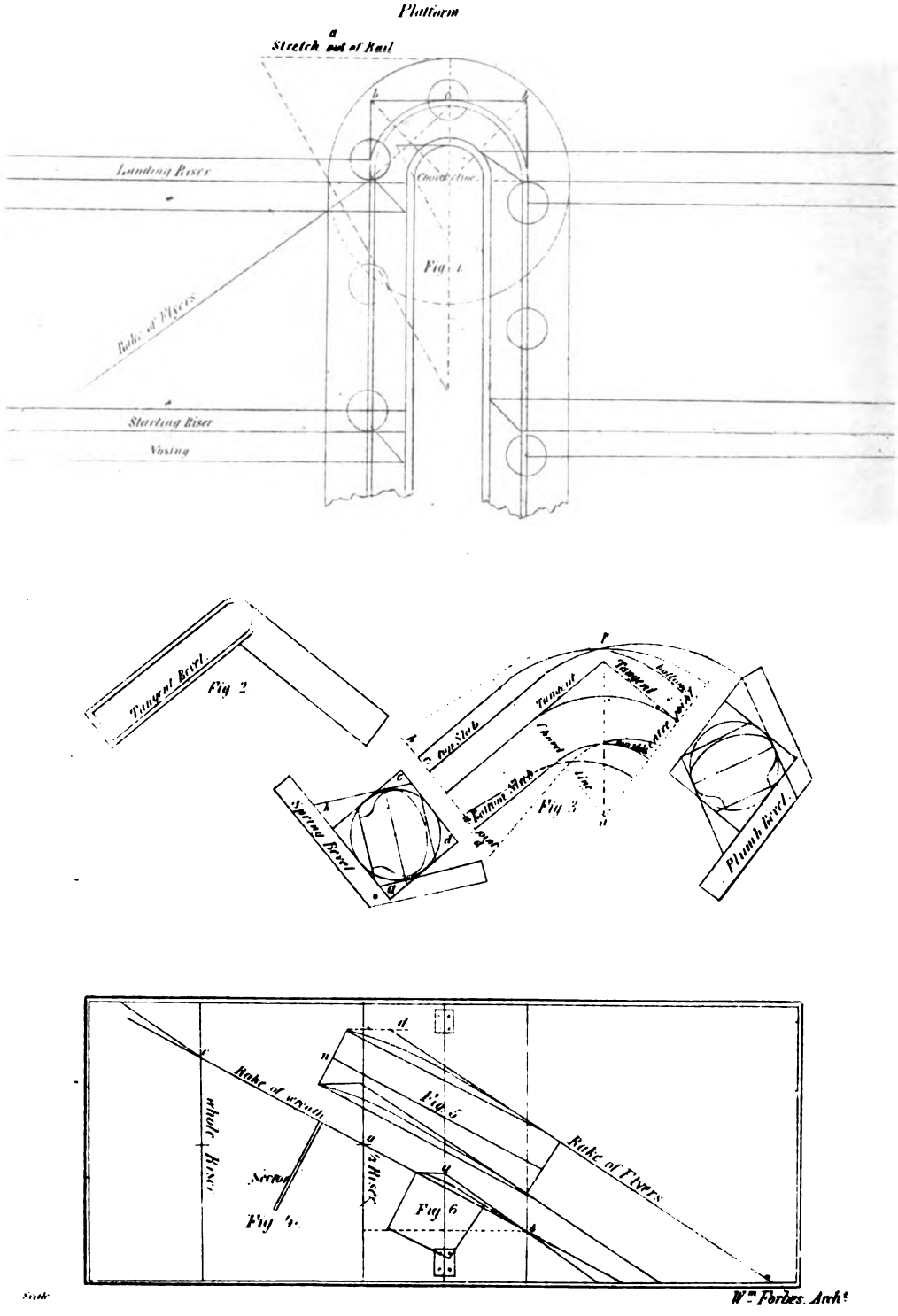
PLATE 10.



THE SECTORIAN SYSTEM OF HAND-RAILING.

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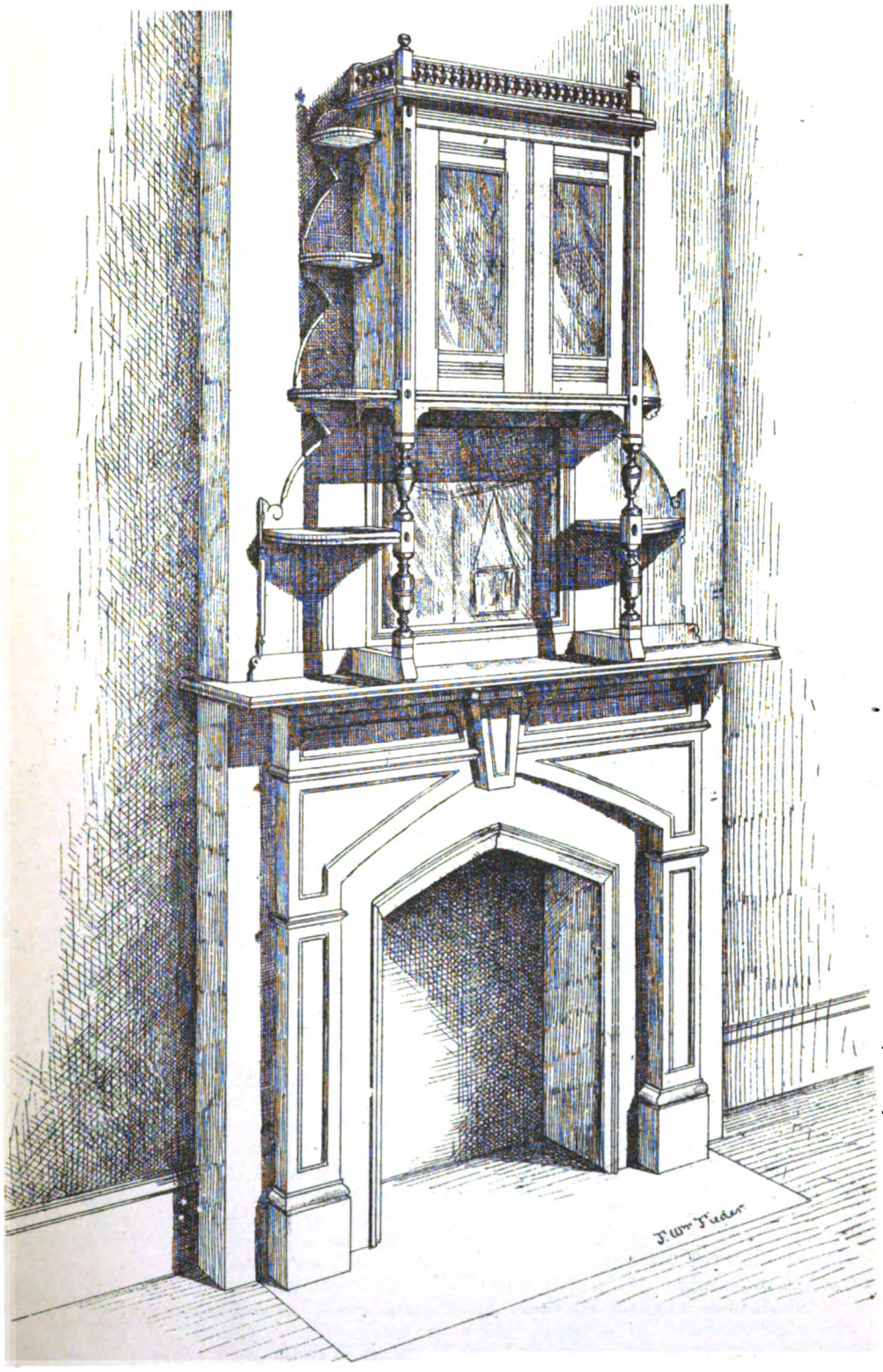
PLATE 11.



MANTEL AND CABINET.

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lower edge of the fillet is a tangent to the upper part of the curve; and in Fig. 8 the upper edge of the fillet is a tangent to the curve of the lower extremity. Suppose now that the arc R *q* is described to fancy; then, if it touch the lower edge R E of the fillet at R, and if R *b* be perpendicular to R E, the centre of the circle which will touch the line R E at R will be in the line R *b*; therefore, from a centre on the line R *b*, with any radius describe the arc. Draw P *c* perpendicular to D P. In P *c* cut off P *a* equal to the radius of the lesser circle, and join *a b*. Bisect *a b* by a perpendicular *f c*. Draw *c q* through the point of intersection *c* and the centre *b*. From *c* with the radius *c q* describe the arc *q* P, and this will complete the scotias.

(To be continued.)

The Sectorian System of Hand-Railing.

THIS plate shows a platform stairs on a level landing, with a six inch cylinder and three and a half inch rail.

Fig. 1. The plan showing the stretch out of rail as at a, inside and out. Through the centre of the rail, at the top and sides, are tangents which intersect at b, and are of the first importance in the development of this work, as all rails are worked from centres.

Fig. 2 is the tangent bevel, so called as the instrument used for obtaining the oblique bevel across the face of the sector, Fig. 4, when closed to a right angle or any other required.

Fig. 3 is the lower part of wreath; the form of which is obtained by first spreading the sector and getting the distance from b to c, Fig. 1, and applying it to the sector each way as shown; then raise perpendiculars from these points and draw a base line, starting at b, across to the left, and set up half riser at a; then from b through a, draw the line b, c, which will be the rake of the wreath. The lines from b down, and from c up, show the rake of the flyers. Now, having obtained this line, close the sector to a right angle, place pins on the line, and place the tangent bevel astride the hinge joint with the inner edge of each blade thin so as to lie close to the pins, and see the edge fits the line exactly, as much depends on accuracy at this point. Having obtained the bevel, and while in position on the sector, take the spring or small bevel and apply one blade to the face of the sector and the other to the tangent bevel at a right angle with the blade; this gives the spring and plumb lines for the concave and convex edges of the rail, and by removing the slabs as marked, the inner and outer twists are obtained for the application of the falling moulds, which gives the twist of the top and bottom faces and also the thickness of the rail.

Now remove the tangent bevel from the sector, and lay it flat on the board of which the mould is to be made, and mark from the inner edge of it each way to the chord line on one side and to the centre joint on the other. The distance is obtained by measuring on the raking line of sector from a and b to the centre. Then, from these points on Fig. 3, draw at right angle with the tangents, the chord line and centre joint until they intersect at a, which makes the point to describe the circle for the wreaths both concave and convex. The sections at the end of the wreath are so well defined, as also the application of the bevel, that further explanation is deemed unnecessary.

Figs. 5 and 6 are the moulds for the concave and convex surfaces of wreaths, and must be the width of the thickness of the same, and obtained as shown on the sector. Draw a line parallel with rake of wreath; then set off the thickness, and extend the line to the perpendicular on the right; then draw rake of flyers entended to d; then take distance of the stretch-out at Fig. 1 and extend across the sector at a right angle, and from the perpendicular line on the right to point n on the left, the curves between the rake of wreath and flyers give the ramp of rail which completes it.

It is best to make the falling moulds of tin, and bend them to the twist as evenly as possible, and secure the ends. See that the concave mould is pressed firmly in its place, and well secured to the wreath. The centre perpendicular line should be drawn on the face of both moulds, giving the rake of the plank from the face. In applying the moulds see that the centre line corresponds with the centre of rail, and if the moulds are required to be raised or lowered, do not raise one end more than the other. When all is made secure, take a good hand or panel saw, and kerf in top and bottom till the saw touches the edge of the mould; then work off to the bottom of kerf, and the thickness and twist of wreath are obtained. All joints are made by squaring from tangents and from the face of the plank, which should be out of wind or twist when the mould is taken. It is seen why I advise tin for the falling moulds—good stiff pasteboard would answer with a every careful person. The tin could not injure the saw much, but the saw might injure the rail by disregarding the pasteboard edge.

If this explanation is not sufficiently explicit, what is lacking must be gathered from other portions of the work.

The application of the face-mould on the wreath-piece, as indicated by lines and letters a, a, b, b, c, c, and d, d, will show the slabs to be taken off. By reversing the face-mould it will answer for both pieces of wreath.

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Isometric Projection.

A CUBE is defined as one of the solid bodies, having six equal square sides, twelve boundary lines of equal length, eight corners, and six diagonal planes. The following is a simple mode of forming a cube within a given circle: Let *a* Fig. 1, Plate 15, be the given circle. Through the centre *a* draw a line or diameter *b a c*, dividing the circle into exactly equal and similar parts. Next divide the right-hand semicircle *c b d e* into three equal parts in the points *d* and *e*, and the left-hand semicircle *c g f b* similarly in the points *g* and *f*. Next join the points *g c*, *c d*, *d e*, *e b* *b f*, *f g*, and from the centre *a* draw lines to *g* and *d*; *g c*, *d e*, *b f* is the cube required. Fig. 2 shows the cube shaded.

But while this is a ready mode of delineating a cube within any given circle, it must be remembered that this does not enable an exactly correct isometrical projection of a cube of which the side is given. Thus: suppose the line *a b*, Fig. 2, to represent the length of one of the sides of a cube, of which it was desired to have an isometrical projection; if this projection was made, as say Fig. 1, the length of the corresponding side, *g c*, Fig. 1, would not be the same as *a b*, but less. A line, therefore, when projected isometrically, is less than the line from which it is projected, and this is in proportion of 9 to 11; a line, then, 11 inches long, when projected isometrically, will be only 9 inches long. A method is therefore required by which we can project or draw a cube isometrically of which the cube is given. This is done below. Let *a b*, Fig. 3, be the length of one of the boundary lines of a cube of which *a b c d* is the side. Draw the diagonals *a b c d*, and from *b* a line *b e*, cutting the diagonal *c a*, so as to make the angle *d b e* equal to 30°. Then from any point, as *a*, Fig. 4, with radius equal to the distance *b e*, Fig. 3, describe a circle, and divide this with the same distance into six equal parts in the points *c d e f* and *g*, which being joined as in Fig. 1, will form a cube of which the side *g f* will be an isometrical projection of *a b*, Fig. 3. To form the angle *d b e* of 30°, let *a c b d*, Fig. 5, be the diagonals of the square *a b c d*, Fig. 3, then from point *a*, corresponding to point *b*, Fig. 3, with a radius of 60°, taken from a scale of chords, describe the arc *e f*; then from the same scale of chords take the distance 30°, and set this off from the point *e* to the point *f*; from *a* draw *a f*; *b a f* is an angle of 30°.

An isometrical line being as above stated in proportion of 9 to 11 to a line of which it is the projection, an isometrical scale may be made by which a series of cubes may be projected in correct isometrical perspective. This scale may be made by drawing two lines, *a b*, *b c*, Fig. 6, at right angles, making *b c* nine elevenths of the line *a b*, and joining *c a*. Then make the line *a b* to represent an ordinary scale, say of eighths of an inch or inches, and suppose the point *d* to represent the portion of the sixth inch, draw *d e* parallel to *a c*, cutting *b c* in *e*. Then the distance *b e*, taken in the compasses, will be the isometrical projection of a line, say 6 inches long, of which the correct scale is given in the line *a b*. The use of this scale in projecting circles will be fully described hereafter.

As before defined, a cube is a solid body having six sides, of which all the sides are equal; in the isometrical projection of a cube, as in Fig. 2, three of these sides are shown; of these three we designate the side *c* the upper side, *d* the "left hand," and *e* the "right hand" sides. Now by cutting these sides by lines parallel to them the representation of right-lined and rectangular objects will be obtained with great facility.

Fig. 8 represents the method of making a "scale of tangents," useful in cutting isometrical planes at any angle.

The remaining figures will be explained in another paper.

(To be continued.)

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

6. SCREW-DRIVER.—Can any of your readers tell me the reason why a screw-driver with a long blade will drive a screw with greater ease than one with a shorter blade?—GAD.

7. MITRE.—I would like to know whether there are many joiners that are able to cut a true mitre "by the eye," without the aid of a mitre-box or templet? I have frequently cut mouldings, stops, and other work that required mitring without a box or templet, and the joints have been as true as if cut in a box.

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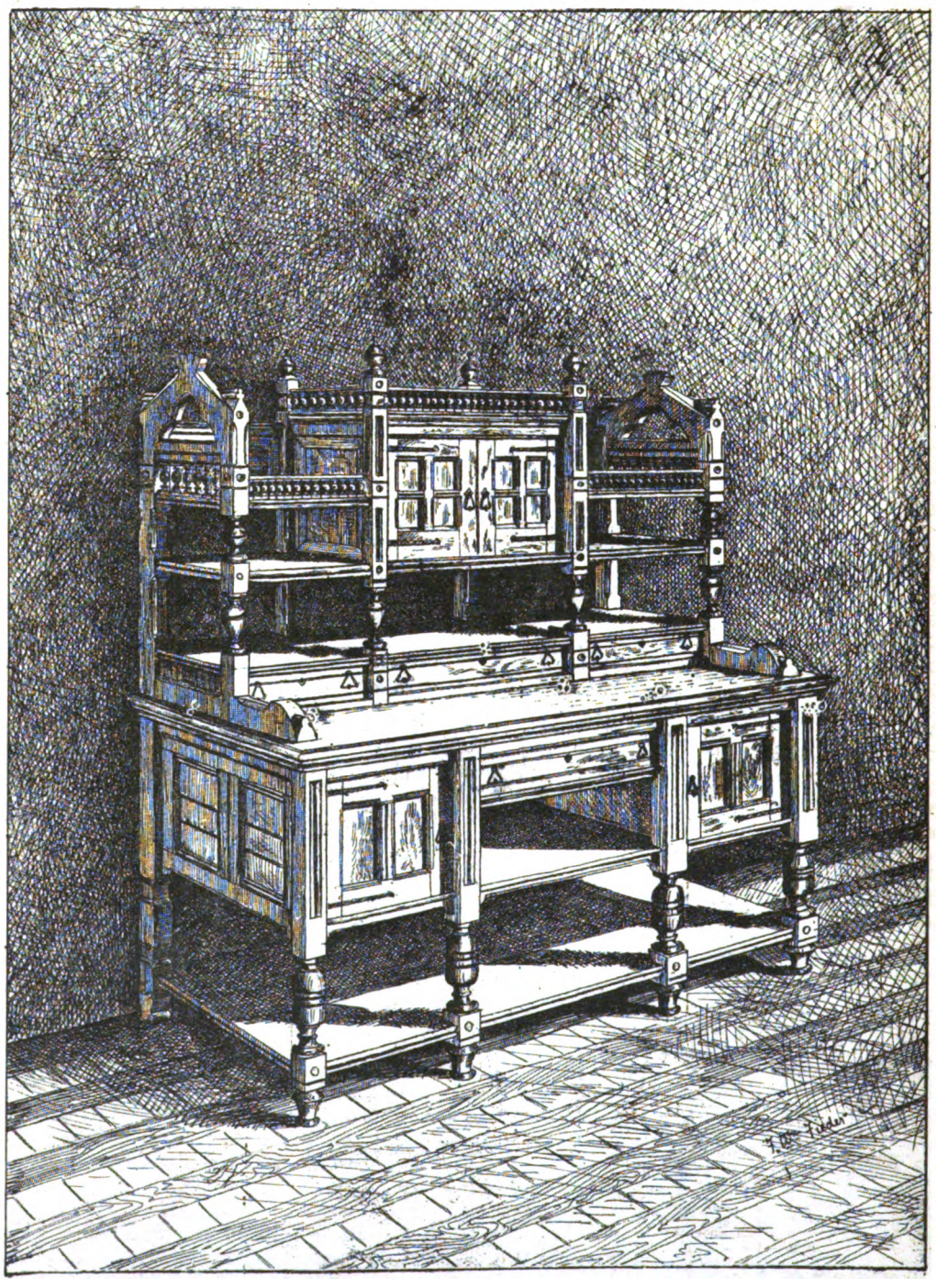
PLATE 12.



DINING-ROOM SIDE-BOARD.

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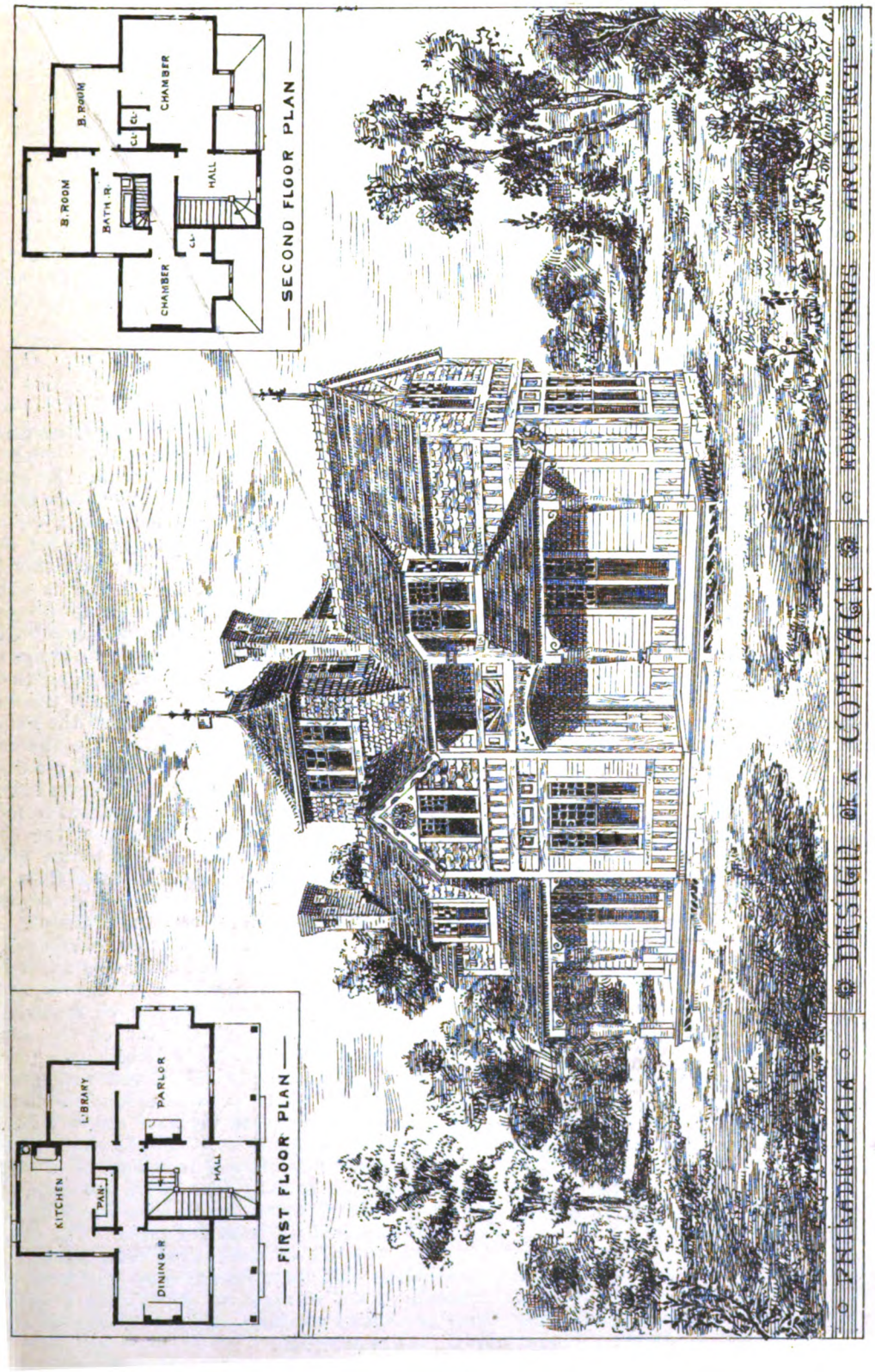
PLATE 13.

COTTAGE IN QUEEN ANN STYLE.



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Perhaps there are many other joiners that can cut a mitre as true as I can without aids, but I have never met any of them.—NEWARK.

8. WARDROBE DESIGN.—I should be thankful if some of your readers would favor me with a design for a lady's wardrobe 3 feet wide and about 7 feet high. I should like it to have a nice panel door and a drawer below that can be drawn out without opening the door. I should like it also, if it could be so arranged, that the whole thing could be taken apart and put together without injuring it. —NED.

9. MOULDING CUTTERS.—I want to temper some moulding cutters for a "sticking machine;" what color should I leave the steel to insure them a good temper?—MOULDING MACHINE.

10. BRIDGING.—Is it better to bridge joists with "herring-bone bridging" than to fit solid plank with ends to joists between the floor timber?—SCRATCH-AWL.

11. GLUE.—How can mica be prepared so as to answer for glue? I can get plenty of mica where I am, and I am informed that a good glue can be manufactured from it, and what I want to know is how to prepare it?—TENN.

12. PAINTING.—1st. How can I estimate the amount of paint required to cover a building of a given size? 2d. How much lead is required to a given quantity of oil, or in what proportion used? 3d. How many yards of surface should a good man paint in a day? 4th. What is the average cost of good white lead and oil? 5th. What is the best kind of drier used for house-painting? I will be obliged to any of your readers who will kindly answer the foregoing questions through the WOOD-WORKER.—BOUND BROOK.

Answers.

We wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the hard-working man.

1. PLANE IRONS.—Butcher's plane irons are numbered 1, 2, 3, etc., to tell the sizes. —SQUARE.

1. PLANE IRONS.—I am informed that the numbers on Butcher's plane irons are the numbers of the men who make them. Thus No. 2 was forged by the man who is known in the forging shop as No. 2, the number of the fire he worked at. By this method bad or defective irons can be traced to their makers.—SHEFFIELD.

2. PICTURE FRAMES.—Size joints with glue, then let dry, glue again, then put together and then brad for good work.—BRAD.

4. COMBINATION PLANES.—The Stanley Rule and Level Co. manufacture the best combination plane, but the best are scarcely worth chest room; when you go to buy, don't!—HARD CASE.

5. HARDWOOD PINS.—Use dry hickory, of course. Green hickory used for pins would "dose" and be worthless in twelve months.—MAINE.

Japanese Houses.

THE Japanese houses are constructed in a very singular style—one peculiar to themselves—they build a house within a house.

Among the better classes the outer houses are generally built of stone, or of a bamboo frame-work, or lath, which is covered over with a thick and tenacious mud; this being covered with a coat of plaster is either painted in some sombre color or becomes bleached by exposure to the weather. Over the surface of the buildings mouldings are often arranged in diagonal lines, and these, when painted white, contrast with the dark background behind, and lend to the houses a curious piebald appearance. In the construction of the roofs colored tiles are used, alternately black or white; the eaves extend low down in front of the walls so as to form a protection to the inmates from the sun, and the oiled windows, made of paper, effectually keep out the rain. Besides these are movable shutters, which by night are secured to the posts which support the verandas.

The inner, or house proper, consists of a large frame-work raised a few feet above the ground, and is divided into several rooms by means of panels, which can be removed if necessary. The raised floor of the inner abode is covered with colored mats, made soft and thick by being lined with straw, and extend over the entire area of the house. The mats covering the floor are very neatly woven and bound with colored cloth, and as the law prescribes that they shall be of a uniform size, measure four by six feet each, and are placed upon the floor so carefully that they appear to be of one piece. The people sit upon these mats to eat their meals, converse with their friends and neighbors, and lie down at night to sleep, when a quilted mat for a covering, and a hard box for a pillow is provided.

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Oak Graining.

Oil graining color is made in the following manner: Procure some finely ground burnt umber and raw sienna (or Vandyke brown and raw sienna, if a dark oak is required), and thin with equal parts of linseed oil and turpentine. Add a large quantity of patent dryers to make it stand the comb. The color is now ready for use. The graining color is brushed over the work in an ordinary manner with a pound brush; care being taken not to put too much color on, or else it is very liable to look dirty. A dry dusting brush is now used to stipple with; which, if properly done, will distribute the color evenly. It is now ready for combing. Take first a medium or coarse cut gutta-percha comb, and draw it down one side of the panel, then use a finer one to complete it. This comb will leave the marks of the grain in clear, unbroken lines, from top to bottom of the panel. We now take a fine steel comb, and go over the whole of the previous combing; but, in drawing this comb down, we either move it in a slanting or diagonal direction across the previous combing, or draw it down with a quick and short wavy motion and curl. Both the former and the latter motion will break up the long lines left by the gutta-percha comb into short bits, which, of course, represent the pores or grains of the real wood. Next take out the lights of figuring or veining. This is effected by means of a piece of wash leather, held tightly over the thumb nail. Every time a few lights are wiped out the leather should be moved slightly, so that the same part of the leather will not be used twice, thus insuring clean work. There are various methods of doing this, but they require much more practice. When the figures are all wiped out they will require to be softened. By softening we mean the imitation of those half shades seen upon and about the figures in the real wood. This is imitated by doubling a piece of wash leather into a small roll, and with the side of this the grain is partly wiped away or softened. Care should be taken not to wipe off the whole of the grain. If you had a piece of real wood to look at occasionally it would help you a great deal. As soon as the oil color is dry it should be overgrained. This is effected in water color. Next go over the work with a bit of sponge and soap to prevent it cissing. Before laying on the overgraining wash out the sponge and wipe the work. It is now ready to receive the color. Grind up finely a little Vandyke brown in water, and dilute it with equal proportions of table-beer and water. It is now ready. Take a flat hog-hair brush, three or four inches wide, dip it in the color, and draw it over the work—in most cases in the direction of the combing—but occasionally crossing it. The hair of the brush being thinly placed will separate in patches, and hence the color will be deposited in streaks, resembling the natural gradations which the wood presents. If you have not a brush of this kind you may use a sponge to put in the streaks and soften off. When dry, varnish in the usual way.

The Care of Shop Tools.

The *American Machinist* has some important suggestions concerning the advantage of care and system in the treatment of shop tools. First cost of tools seldom represents their ultimate cost, whether it becomes necessary to repair them or not. If a good mechanic makes a tool last a year in constant usage, while his careless neighbor uses up one of the same kind in six months, the cost of the latter should be accounted twice that of the former. When repairs are made their value must be added in computing the whole cost of the tool.

One primary reason why some shops can show a greater profit on a given amount of work is because they get more service out of their tools. This is just as evident when tools are cheap as when they are dear, for the products of mechanical labor fluctuate the same as the first cost of tools; and if a large part of the income of business goes for working tools and repairs to thesame, balances on the right side of the ledger are likely to be diminutive, if indeed they appear at all. It is the first requisite that tools and machines should be adapted to the work to be performed. Fine tools should not be used on heavy, coarse work. They must also be kept in good working order, cutting edges well sharpened and bearing surfaces lubricated, shafting kept well aligned, pulleys balanced, belts kept clean and pliable and at the correct tension, rust prevented, emery wheels and grindstones trued up, and dirt kept out of all wearing parts.

Machines should be mounted on stable foundations and run neither above nor below the proper speed required to do the work. Small tools demand as much care as large ones, and a careless or inexperienced workman will often spoil more than the amount of his wages in files, drills, chucks, reamers, taps, dies, calipers, wrenches, and the like, unless closely looked after by the master mechanic. It is therefore very essential, in order to insure proper care of tools, that workmen know just how to use them. All small tools should be laid away systematically in a dry place when not in use. In large shops a room should be set apart for this purpose, and a man detailed to take charge of it and keep the tools in good working order. There is no part of a large machine

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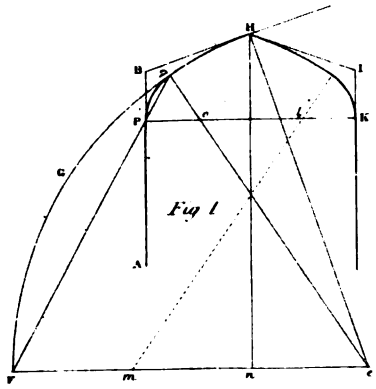
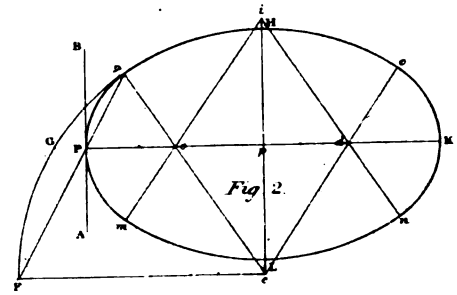
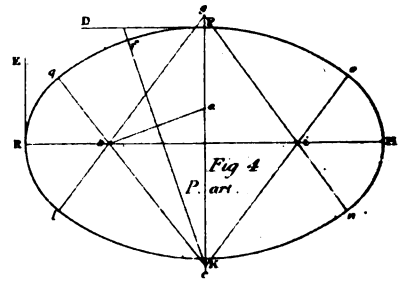
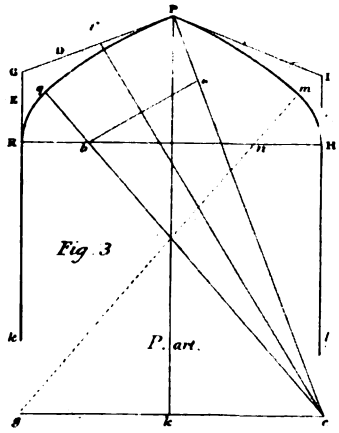
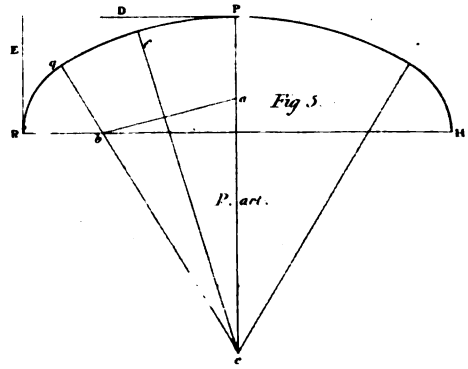
PLATE 14.

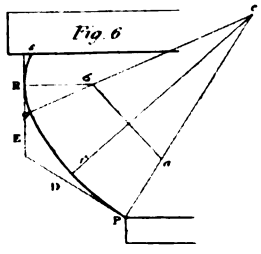


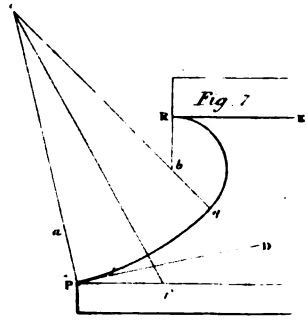


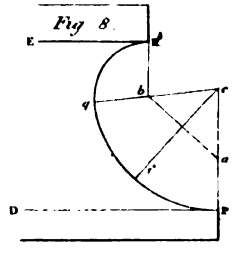












PRACTICAL CARPENTRY.

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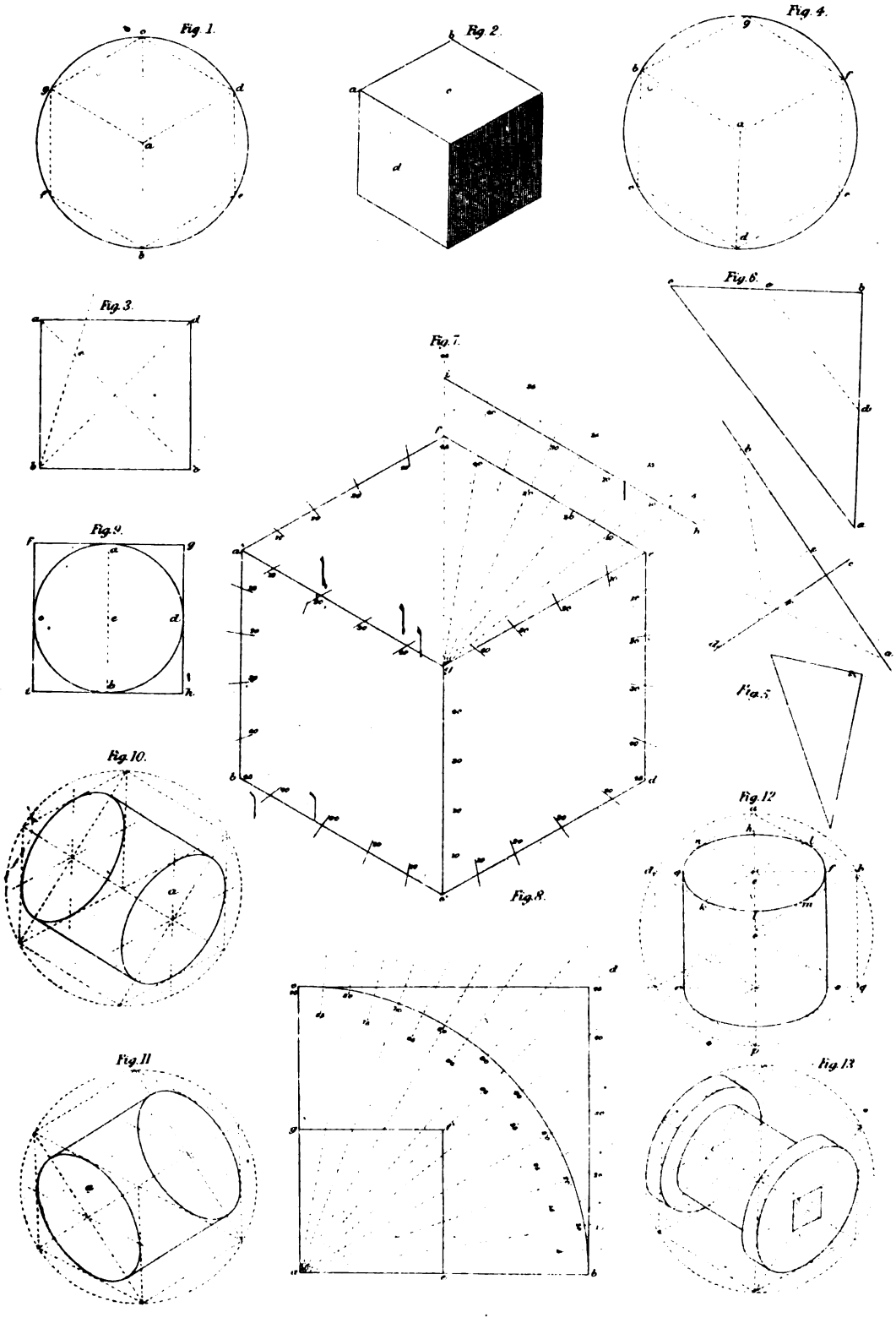
PLATE 15.



ISOMETRIC PROJECTION.

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shop from which an outsider can form a better judgment of the general management than by an observation of the tool-room. The best economy is established by securing none but the best tools at the outset, for in the long run they will be found the cheapest. As a rule, it is expensive trying experiments by purchasing tools of new and untried patterns or material. New machines and tools are often constructed so as to leave no reasonable doubt of their successful operation, but this is not invariably the case. It is always safe to buy those about the working of which there is no doubt. Second-hand machinery can often be obtained in good order at very low prices, if the purchaser has extra time at his disposal to look it up, but when machinery is much worn, its value is questionable at any price. It is not only easier, but a greater satisfaction, to take care of good tools than of poor ones.

Making Wooden Pulleys.

A PULLEY over twenty-four inches in diameter should be built on a spider; all under that size can be made on a wood centrepiece about two inches thick, having a cast-iron flange, say eight inches in diameter for a twenty-inch pulley, with a hub and boss about three inches long. Four bolt holes should be made through the flange for bolting to wood centre. The latter should be a nice fit on the shaft, with key seat the same as for an iron pulley. After preparing the centerpiece by planing smooth and straight, make a templet, the length being about one sixth or one eighth of the diameter and two inches wide. By this mark out the amount of stuff for the required width of the face. The lumber should be about seven eighths or an inch thick, sawed out to the same circle as centerpiece. Plane straight and smooth, and make the butt joints a perfect fit; glue and nail on. If a flange is desired on each edge to keep the belt from running off, make the outside layer a little wider and allow it to lap over the face. Put the pulley into a lathe and turn it up. Thus made, it will be durable and will not easily break.—*B. J. Donaway in Scientific American.*

The Proper Speed for Circular Saws.

THE *Lumberman's Gazette* says: "Nine thousand feet per minute—that is nearly two miles per minute for the rim of a circular saw to travel may be laid down as a rule. For example: A saw 12 inches in diameter, or 3 feet around the rim, 3000 revolutions; 24 inches in diameter, or 6 feet around the rim, 1500; 3 feet in diameter, or 9 feet around the rim, 1000 revolutions; 4 feet in diameter, or 12 feet around the rim, 750 revolutions; 5 feet in diameter, or 15 feet around the rim, 600 revolutions. The rim of the saw will run a little faster than this reckoning, on account of the circumference being more than three times as large as the diameter. Shingle or some other saws, either riveted to a cast-iron collar or very thick at the centre and thin at the rim, may be run with safety at a greater speed."

Useful Items for Office and Shop.

CEMENT FOR WOOD AND IRON.—A foreign journal speaks of a cement made of oxide of lead and concentrated glycerine, which unites wood to iron with remarkable efficiency. The composition is insoluble in acids, is unaffected by the action of heat, sets rapidly, and acquires an extraordinary hardness.

A SOLUTION of four ounces of sandarac, one ounce gum mastic, and four ounces shellac, in one pound of alcohol, to which two ounces oil of turpentine is added, can be recommended as a varnish over stained woods.

POSTAGE-STAMP MUCILAGE.—The following is said to be the formula for the mucilage used on the United States postage stamps: Dextrine, two ounces; acetic acid, one ounce; water, five ounces; alcohol, one ounce. Add the alcohol to the other ingredients when the dextrine is completely dissolved.

VARNISH for indoor painting is made by melting six parts of gum copal and adding two and a half parts of linseed oil. When cold the yield is $6\frac{1}{16}$ parts of concentrated varnish, having the consistence of wax, as the loss on the gum amounts to one and four fifth parts. One part of this concentrated varnish mixed in the cold with one part of oil of turpentine yields two parts of very good varnish for inside work.

STEEL RUST.—According to the *Chemiker Zeitung*, articles of steel which have become rusty may becleansed by brushing with a paste made up of thirty parts cyanide of potassium, thirty parts curd soap, sixty parts of precipitated chalk, and a sufficiency of water. Our contemporary adds that great care is required in preparing and using this poisonous mixture.

IMITATION MAHOGANY.—Brush over the wood with common ink; when that is dry brush it over with dragon's-blood mixed with methylated spirit in the proportion of one ounce dragon's-blood to one half pint of the methylated spirit. When that is dry, varnish with spirit varnish. Cost of dragon's-

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blood 3d. per ounce; methylated spirit 6d. per pint; varnish 1s. 4d. per pint.

ROSEWOOD.—Boil one half pound of logwood in three pints of water till it is of a very dark red; add one half ounce of salt of tartar. Stain the work with the liquor while it is boiling hot, giving three coats; then, with a painter's graining brush, form streaks with the following liquor: Boil one half pound of logwood chips in two quarts of water; add one ounce pearlash, and apply hot.

SHORTENING A BELT.—It is frequently convenient to shorten a belt temporarily, especially in the upper stories of a mill, when the miller would be put to some trouble and the loss of considerable time to shorten the belt in the customary way. In such cases we have heard the following simple method recommended, which will answer very well where the belt does not run near a beam or other obstruction: Unlace the belt and place the two ends together, making the laced portions parallel, and allowing them to project away from the pulleys. They may then be laced again, using the same holes and fastenings. Though very simple, this hint may save annoyance and time.

VARNISH FOR BASKET WARE.—The following varnish for basket work is said to dry rapidly, to possess sufficient elasticity, and to be applicable with or without admixture of color: Heat 375 grains of good linseed oil on a sand-bath until it becomes stringy, and a drop placed on a cold, inclined surface does not run; then add gradually 7500 grains of copal oil varnish, or any other copal varnish. As considerable effervescence takes place, a large vessel is necessary. The desired consistency is given to it, when cold, by addition of oil of turpentine.

A CEMENT for such purposes as fixing metal letters to glass windows consists of copal varnish, fifteen parts; drying oil, five parts; turpentine, three parts; oil of turpentine, two parts; liquefied marine glue, five parts. Melt in a water-bath, and add ten parts dry slaked lime.

CEMENT FOR STEAM JOINTS.—Take sal-ammoniac, two ounces; sublimed sulphur, one ounce; fine cast-iron turnings, one pound; mix in a mortar, and keep dry. When to be used, mix with twenty times its quantity of clean iron turnings or filings, and triturate the whole in a mortar; then wet with water until of proper consistence. A red putty for steam joints can be made of stiff white-lead worked well in red-lead powder.

VARNISH FOR PAINTINGS.—"Amateur" is informed that a good varnish can be made as follows: Mastic, six ounces; pure turpentine, one half ounce; camphor, two drachms; spirits of turpentine, nineteen ounces; add first the camphor to the turpentine. The mixture is made in a water-bath, and when the solution is effected, add the mastic and the spirits of turpentine near the end of the operation, then filter through a cotton cloth. The varnish should be laid on very carefully.

WATERPROOF PAPER.—Sheets of stout manilla passed through a hot bath of aqueous solution of zinc chloride (at 75° B.), pressed strongly together and then soaked in dilute aqueous soda solution containing a small amount of glycerine, cohere to form a strong, stiff, waterproof board admirably adapted to the construction of small boats. Single sheets of paper passed quickly through the zinc chloride bath, pressed and washed and dried, are waterproof, and may be otherwise joined to form waterproof boards by any suitable cement.

SCHEDULE OF DAILY WAGES.

(Revised monthly.)

LOCALITIES.	TRADES. Laborer.	Carpenter.	Stair-Builder.	Joiner.	Cabinet-Maker.	Finisher.	Painter.
	$	$	$	$	$	$	$
New York	1 25 @ 2 25	2 50 @ 2 75	2 25 @ 2 75	2 25 @ 2 50	1 50 @ 3 00	1 50 @ 3 00	1 50 @ 2 00
Boston	1 00 @ 1 50	1 50 @ 2 25	2 00 @ 2 25	1 50 @ 2 00	1 50 @ 2 50	.....	1 75 @ 2 25
Baltimore	1 00 @ 1 60	1 25 @ 2 75	2 25 @ 3 00	2 50 @ 3 25	2 50 @ 3 25	2 00 @ 2 75	1 50 @ 2 50
Philadelphia	1 10 @ 1 60	1 50 @ 2 25	2 50 @	.....	.....	.....	2 00 @ 2 50
St. Louis	1 00 @ 2 10	1 50 @ 2 00	1 50 @ 3 00	.....	.....	1 50 @ 2 10	2 00 @ 2 50
Chicago	1 00 @ 1 25	1 25 @ 2 00	2 00 @ 3 00	1 75 @ 2 50	1 75 @ 2 50	1 50 @ 2 10	1 75 @ 2 25
Cincinnati	1 00 @ 1 50	1 75 @ 2 25	1 75 @ 2 50	.....	.....	.....	1 75 @ 2 00
San Francisco	2 00 @ 3 00	3 00 @ 4 00	.....	.....	.....	.....	.....
Texas	1 75 @ 2 00	2 50 @ 3 25	.....	2 00 @ 3 00	2 00 @ 3 00	.....	.....
Ottawa (Canada)	80 @ 1 10	1 25 @ 2 00	1 75 @ 2 50	1 50 @ 2 00	1 50 @ 2 00	1 00 @ 1 75	1 00 @ 1 75
Toronto (Canada)	1 00 @ 1 25	1 25 @ 2 25	2 00 @ 3 00	1 50 @ 2 25	1 50 @ 2 25	1 00 @ 2 00	1 00 @ 2 00

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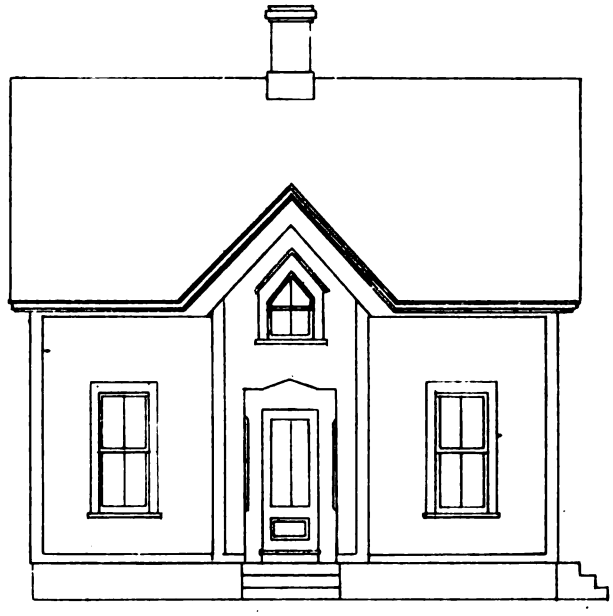
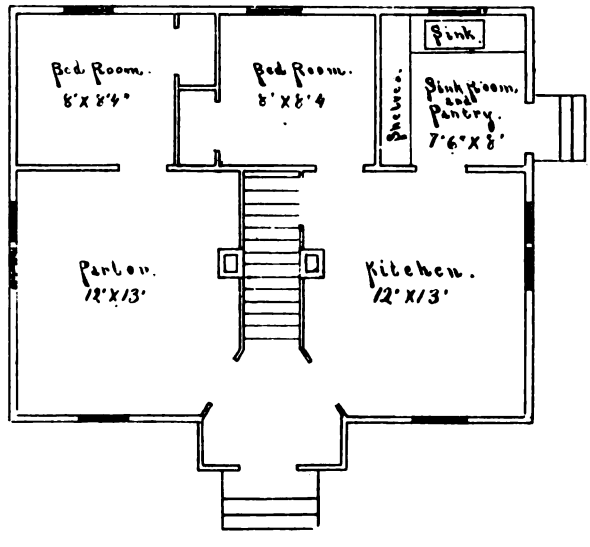
PLATE 16.





A WORKINGMAN'S COTTAGE.

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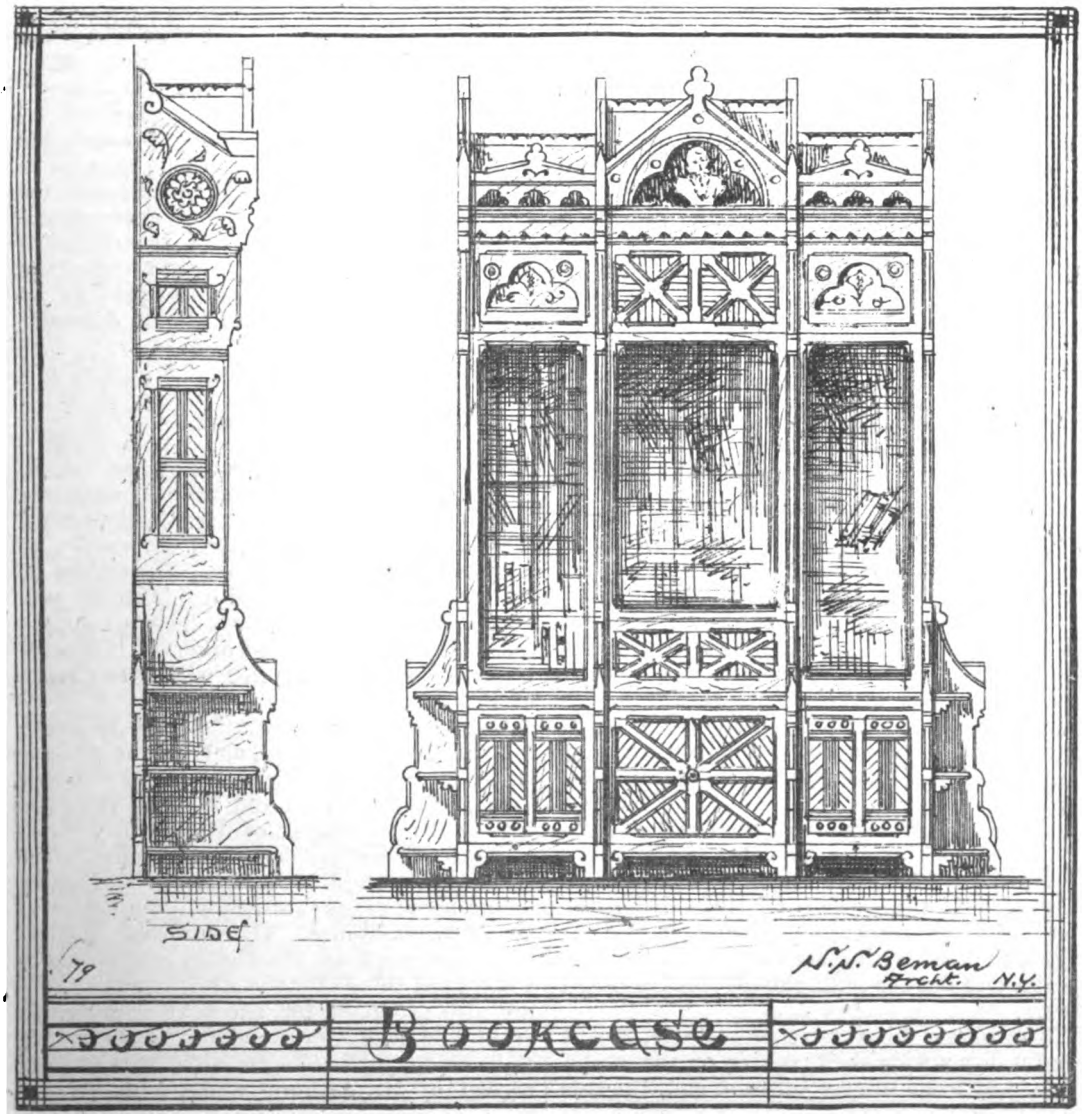
THE ILLUSTRATED WOOD WORKER

FOR JOINERS, CABINET MAKERS, STAIR BUILDERS, CARPENTERS, CAR BUILDERS, &c. &c.

VOL. 1. No. 3 MARCH, 1879. PRICE TEN CENTS.



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Illustrated Wood-Worker.

TERMS OF SUBSCRIPTION.

One copy monthly, one year,	$1 00
Four copies, three months to one address,	1 00
Single copies,	10

*** The ILLUSTRATED WOOD-WORKER will be sent to any person in the United States or Canada, who desires it, post free, on receipt of the above rates.

OFFICE:

No. 176 Broadway, New York City.

CHAS. D. LAKEY, *Publisher*. FRED. T. HODGSON, *Editor*.

All correspondence intended for the columns of the WOOD-WORKER should be sent to the Editor; but letters of a business nature, or which contain money or Post-Office orders, should be addressed to the Publisher. Rejected communications will not be returned unless the persons sending them remit return postage.

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ILLUSTRATIONS.

Plate 17, Design for Bookcase; Plate 18, Hand-Railing; Plate 19, Elevation and Plan of Sideboard; Plate 20, Library Tables; Plate 21, Design for Easel; Plate 22, Practical Carpentry; Plate 23, Hip Roofs, etc.; Plate 24, Handsome Design for Wardrobe.

Our Illustrations.

THE bookcase shown on our front page was designed by S. S. Beman, architect, of No. 11, Pine Street, New York, for a gentleman in Elizabeth, N. J., and has been much admired by many who have seen the work since it was built. It is made of ash, with plate glass in the doors, and nickel-plated furniture. It would look equally well if constructed in chestnut or oak. The construction is such that any intelligent mechanic can make one similar.

Plate 18 is illustrative of the articles on the "Sectorian System of Hand-railing."

On plate 19 is shown a very handsome design of a sideboard, which is intended to be built of black walnut, with the upper part entirely inclosed with glass doors. The hinge-plates and drawer-pulls should be of polished brass.

The library table shown on plate 20, Figs. 1 and 2, has a wide shelf, as seen on the elevation. It has a drawer on each end, the side of one of them runs in by the side of the other, allowing the drawers to be opened their entire lengths. The reading table is arranged for books of reference, such as encyclopædias, etc., with a shallow drawer for writing materials in the front, and a portfolio in the back for large books or engravings. The top is inclined, for easier reference to the "Webster's Unabridged," which is shown upon the top. The table has casters for convenient moving. The metal trimmings are all polished brass.

Plate 21 shows a very pretty design for an easel. If built of cherry, and ebonized as shown, and properly trimmed with hinge-plates of polished brass, it will have a very chaste and handsome appearance.

Plates 22 and 23 are fully explained on page of the present number.

Plate 24 is a wardrobe, designed by Mr. Fieder, in answer to a request made by one of our correspondents. The design is an excellent one, combining, as it does, the Eastlake and Queen Anne styles, the construction being Eastlake's, and the ornamentation being Queen Anne's. It is so constructed that it can be taken apart with ease, the cross shelves having double tenons, which go through the sides and keyed as shown. The cornice is housed into the stiles, and the pressure of the keys keeps it in place. The two upper panels in the doors are ornamented with emblems of night and morning, the work being done with a roughing tool. It is designed to be executed in any kind of light domestic wood.

The Outlook.

THE WOOD-WORKER may now be considered a success, so far as quality is concerned; every one speaks well of it: architects, artists, cabinet-makers, designers, and carpenters, all alike are loud in its praises. We cannot be otherwise than pleased with this almost universal recognition of our efforts to supply something that the wood-workers of this country really want, at a price within the reach of all.

This month our illustrations are as excellent as they are varied, and all the designs shown are original, which adds greatly to their value. Plates 19, 20, and 21 were designed by Mr. Frank Angel, of Providence, R. I., and are evidently from a master-hand. The front-page design is from Mr. S. S. Beman, whom many of our readers will recognize as an old acquaintance. The wardrobe on plate 24 is the work of Mr. Fieder, who promises some good things for the April number. We are also promised, for our next number, the front and side elevations and plans and details of a very handsome altar that was designed by Mr. Arthur Crooks, architect, and

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which was executed for St. Peter's Church, Rosendale. In fact, good as our previous issues have been, we feel safe in saying that our April issue will be much better.

It is quite evident that times are improving, and as soon as the weather gets better there will be a more active demand for workers in wood than there has been for some years. The severity of the winter has compelled carpenters and joiners to remain idle a greater length of time this season than last, and the present extremely dull period with these trades is due more to the inclemency of the weather than to the scarcity of work. The increased purchasing power of money, bonds, etc., has induced thousands of persons of small property throughout the country towns to build new houses. In the West especially some country villages have doubled their house accommodation during the past five years.

The cabinet-maker will find his business improve along with that of the carpenter, for new houses will require new furnishings, and thus the ball is kept rolling.

Owing, no doubt, to the fact that many thousand miles of road-bed have been improved and steel rails laid within the last few years, less new cars have been required, as the improvements have tended to preserve the rolling stock from wear much longer than formerly, and thus the trade is kept dull. There are visible signs of improvement, however, and we trust that before midsummer the trade will revive to something like its former activity.

Practical Carpentry.

THE usual definition of an ellipse is, that it is "a figure bounded by a regular curve, generated from two foci." This definition is best explained by the use of string and pencil. In Fig. 1, Plate 22, draw the line A B, representing the length of the figure, and at right angles to it draw the line C D, representing its width. Take the distance A E, or one half of the length, and with C as a centre strike the arc F H G. The points at which this arc cuts the major axis, or, in other words, F and G, will be the foci. Drive a pin in each, and also a third one in C. Around these three pins tie a string. Remove the third pin and substitute a pencil. By moving the pencil around the two foci, keeping the string stretched all the time, a regular curve will be produced, which is an ellipse.

Fig. 2 shows a method of drawing an ellipse with a trammel. L M is the major or largest diameter, and P T the minor or short diameter; place the trammel with its centre over the intersection of the two diameters as shown; make the distance on the rod, from the pencil R to the pin F, equal to P S, and from R to the pin C equal to S L; now, let the pins C F move through the grooves, and the pencil will then mark the outline of the ellipse.

The ellipse may also be projected as follows: Take a rod or strip of paper, as shown in Fig. 3, lay out the diameters A B and C D, and mark on the rod or paper O K, equal to L D; also O N, equal to L B. Now move the strip directly on the end adjoining the edge upon which you marked K N. The curve can then be traced through the points so found.

On Fig. 4 is shown a method of finding the exact shape of newel cap on any required mitre with a given form of hand-rail. Suppose S to be the given form of hand-rail; O F N the plan of mitre; T L the diameter of newel cap. Draw the line K G at right angles to T L, from E to N, parallel to G F; draw as many ordinates as may be deemed sufficient, cutting the mitre line F N; with J as centre, and J F as radius, draw F R, then 2, 3, etc. Take E G, and place it at J K and R 6; place 1 5 at 3 8, etc. The line traced through these points at H shows the form of the required newel cap. Should the mitre, extending from edge of cap, equal half the width of the rail, the shape of the cap may be exactly like that of the hand-rail.

The direction of any joint in any ellipse may be found as follows: Find the focii O O, Fig. 5, as explained in Fig. 1. Let V be the point at which the joint is required; draw from O O through V, O S, and O R; mark V S and V R equal. With any distance greater than one half between R and S, with R and S as centres, mark the arcs intersecting at T; draw the line T F, and this will be the point sought. So by biseting the angle S V O, we should find a tangent to the ellipse at the point V. This is a very useful problem, and should be studied until it is thoroughly understood by the student, as it will be found of great value in learning the art of stair-building.

A method of producing an approximate ellipse, and one in quite common use among builders, by reason of its convenience for large figures, is shown in Fig. 6. Lay off the length of the required figure, as shown by A B, and the width as shown by C D. Construct a parallelogram that shall have its sides tangent to the figure at the points of its length and width, all as shown by E F G H. Subdivide one half of the end of the parallelogram into any convenient number of equal parts, as shown by A E, and one half of its side in the same manner, as shown by E D. Connect these two sets of points by intersecting lines in the manner shown in the engraving. Repeat the operation for each of the other corners of the parallelogram. A line traced through the inner set of intersections will be a very close approximation to an ellipse.

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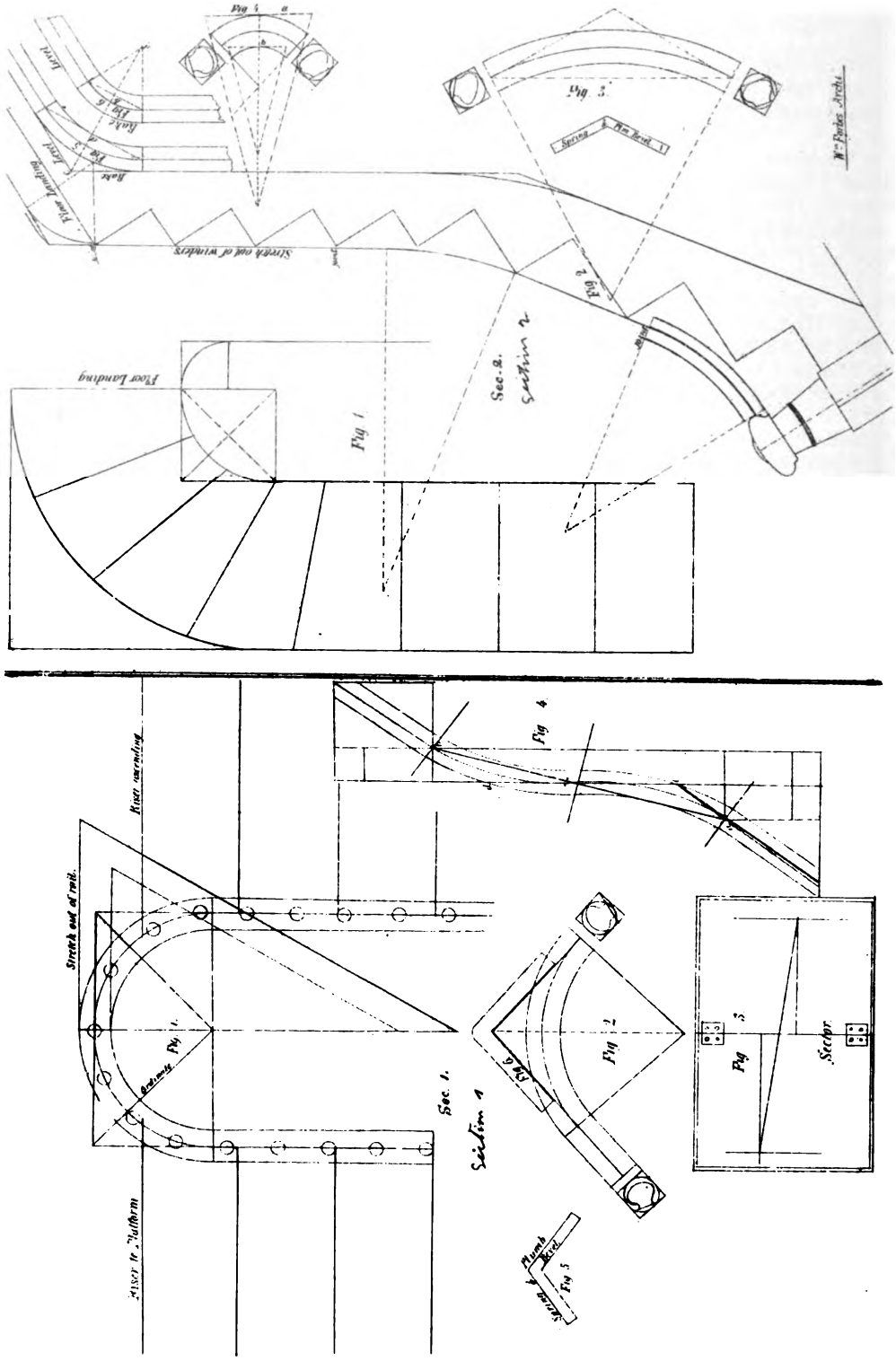
PLATE 34



THE SECTORIAN SYSTEM OF HAND-RAILING

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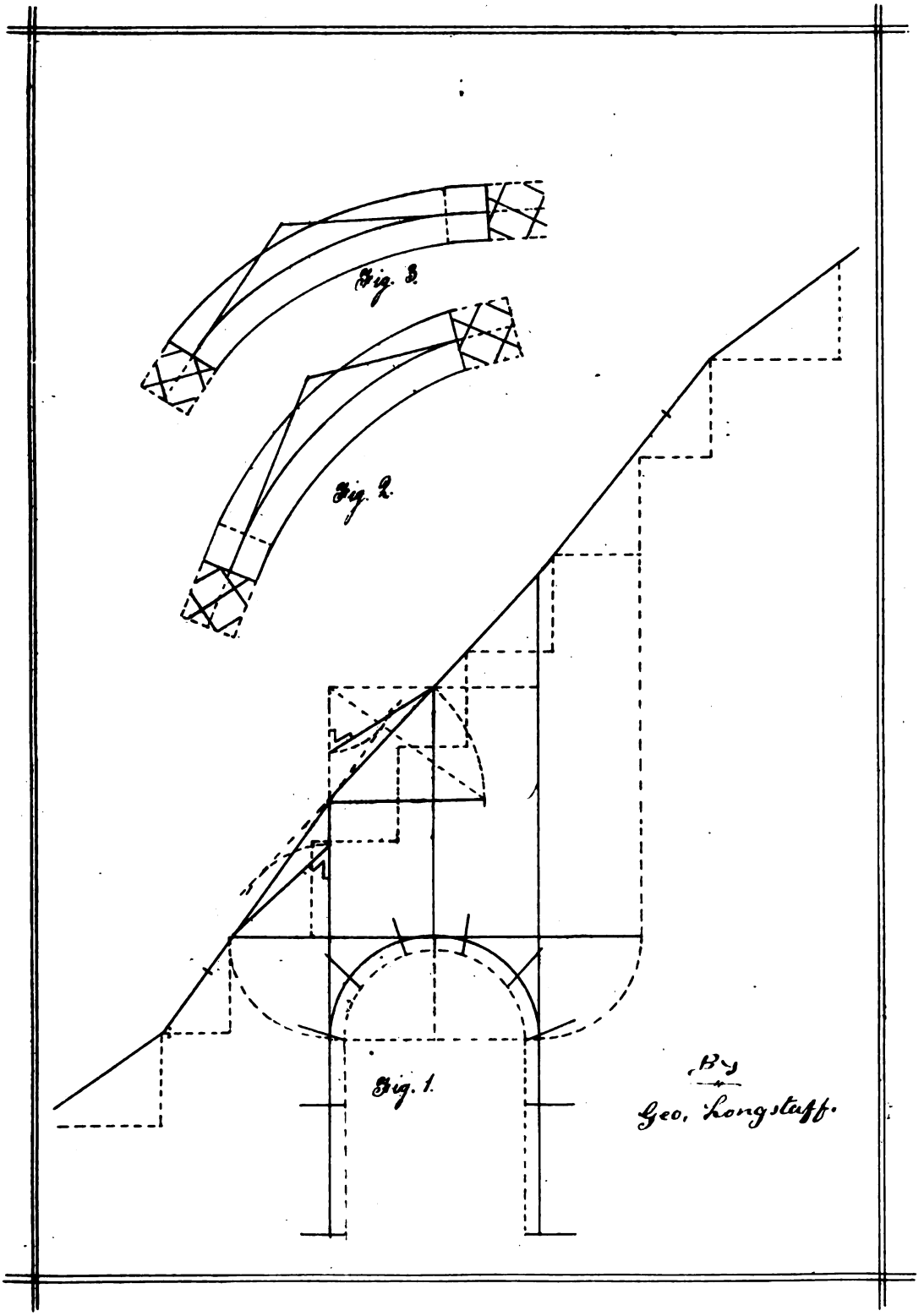
PLATE 27.



HAND-RAILING.

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Let A C (Fig. 6) be the width of the groin arch, and D B its height. Join A B, and divide it into the same number of parts as C B in Fig. 5; and draw through the points 1, 2, 3, 4 the lines D 1, D 2, D 3, D 4. Then from A draw a line perpendicular to A C, and transfer to it the divisions from the corresponding line in Fig. 5; and from these divisions draw lines to B. The intersection of these lines with the lines D 1, D 2, etc., will give points through which the curve may be traced.

To draw an ogee arch.—Divide the width A B (Fig. 7) into four equal parts in *d, c, e;* and on *d, e* erect the square *d, f, g, e.* The points *d, e, f, g,* are the centres of the four quadrants A *k*, *k l*, B *h*, *h l*, composing the arch.

Another Method.—Let A C (Fig. 8) be the width and D B the height of the arch. Join A B, B C, and bisect the lines in *e, f;* then from the centres, A, *e*, B, *f*, C, with the radius A *e* or *e* B, describe the arcs intersecting in the points *g, h, k, l,* which are the centres of the four arcs composing the ogee arch.

Another Method.—When the arch is equilateral. Bisect A B (Fig. 9) in C, join A *h*, B *h*. From C, with the radius A or B, describe the arcs A *d*, B *e;* then, to find the centres of the other arcs, from the points *d, e,* and *h* as centres, and with the same radius as before, describe arcs intersecting each other in the points *f* and *g*, which are the centres of the arcs *h d*, *h e.*

Lessons in Projection.

BY ROBERT RIDDELL, TEACHER OF THE ARTISAN CLASS IN THE HIGH SCHOOL, PHILADELPHIA, PA.

Projection of Straight Lines and Curves.—Let A (Fig. 1, Plate 39) be the given plan, and B C the angle of projection. Draw perpendiculars through the plan, cutting B C. The distances thus given on the angle are transferred to the line C D, from which trace the different members that are to project and intersect with those of plan A.

The elliptical curve K R is obtained by finding two foci as N L, in which fix two pins as shown; then with a piece of thread and a pencil strike the curve the usual way; this curve, when in position, will be found to stand directly over the quarter circle shown on plan A. This principle of obtaining a curve is precisely the same as for finding the section of a cylinder when cut by a plane not parallel with the base.

To understand and form correct ideas of complex problems of this kind, there is no better way than by making a drawing of each one on card-board, and then cutting it at the lines so that it will fold up to the desired shape. If the cut parts do not come freely together without twisting or buckling, there will be some error in the constructive principle which can generally be speedily rectified. It will be seen that by adapting this method of testing problems many serious mistakes may be avoided.

In the problem before us the lines to be cut are marked with crosses, and the bases of these cut parts are marked *o, o, o.* Now let us take that part marked B *x x x x*, and raise it on the folding line *o o* until it is perpendicular with the plan A. Then take the part D K, R S, and C, and fold over at the base line *o o* until it lays on the inclining line B C; it will be seen then that the work is correct, as the lines on D will stand perpendicularly over the corresponding lines on the plan A.

The parts S S should be removed, as by doing so a better idea of the working of the problem will be obtained.

The method of teaching projection by cutting cardboard has many advantages over all other modes of instruction; in fact, it is a workshop operation, as the pupil sees before him a model of the work, and is thereby better able to proceed with the work when putting it in actual practice.

The Sectorian System of Hand-Railing.

FIFTH PAPER.

FIG. 1 (Section 1, Plate 34) in this example shows the ground plan of platform stairs, with one half the landing and ascending treads placed in the platform. The cylinder is of larger size than is generally used for this kind of stairs, and I give this example to show that as easy and as graceful a wreath can be thrown around this as any of smaller size.

Fig. 2 is the lower piece of wreath with a part of straight rail attached. The sections of rail at each end show the direction given by the spring and plumb bevels, which are the same. The bevel, Fig. 6, astride the tangents of this figure shows the angle as obtained on the sector, Fig. 3, which, when folded to an angle of ninety degrees and each blade placed on the line, shows the pitch of half a riser from the chord line to the centre of the cylinder. The angle is obtained, as shown, for getting the tangents of one half the wreath, one mould answering for both pieces by reversing the end. The shank may extend as far as the thickness of stuff will allow.

Fig. 3 is the sector with the line showing the rise, and the horizontal lines, giving the height of half a riser.

Fig. 4 is the shape of the outside falling mould, and is obtained by getting the stretch-out of convex side of wreath from face of the

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two platform risers around that portion of circle on the platform ; draw a line the length of stretch-out, which in this example is two and a half feet ; at the ends of this line set up and down a half riser, and draw a chord, cutting right line in the centre ; then set up and down a flyer, and connect at A and B ; extend the rake of the flyers and connect at C, D on the right line—this gives angles for making easements by intersecting lines ; after which set off for top and bottom lines the thickness of rail. The inside falling mould is obtained in the same manner. When the slabs are taken from the convex and concave sides of the wreath which gives the twist, then apply these moulds, centre to centre with wreath. If the stuff is scant, they may be raised or lowered parallel with centres ; and when made secure, kerf in with a hand-saw to the edges of the moulds and remove the surplus wood, and you have the top and bottom twist without the use of gauges or guess work, and as the plate shows, without the piece being wider in one place than another and no thicker than the width of the rail, and always sawed square from the face of the plank.

On Section 2 of the same plate is shown a stairs with winders, starting below the chord line and landing at the quarter circle. In some situations the space may not be of sufficient width to allow a large cylinder in the turning, and contraction has to take place somewhere. The steps are as narrow as convenience will allow, and the landing above, the same. The winders must have sufficient width to receive, without crowding, the balusters ; hence the necessity of making one part of the cylinder larger than the other, and the upper landing as laid down on this plate.

As before stated, all the lines are the centres, and as Fig. 1 has only one line, and a part of the elevation Fig. 2 the same, of course the width and thickness must be set off each way from this line. The steps are shown half their length, and the tread ten inches wide.

The plan is so plain that a further description is deemed unnecessary. The newel at No. 2 shows the height from the floor by adding the length of a short balluster to the shaft.

The elevation shows the stretch-out of the winders in the wreath, the ramp at the newel, and also at the beginning of the winders.

Fig. 3 is the lower wreath piece, with bevels and twist marked, and needs no further explanation.

Fig. 4 is the upper wreath piece, and is procured in the same way.

Figs. 5 and 6 are the convex and concave falling moulds.

The chord lines A and B, Figs. 5 and 6, are the stretch-out of the wreath, Fig. 4, at A and B, and shows the length of the convex and concave falling moulds. They are drawn to rise half a riser above the floor, so as to admit a long balluster on the landing above. To obtain the falling mould, draw lines on the rake and upper level, intersecting at C, Fig. 5 ; then take the stretch-out A, Fig. 4, and apply it at Fig. 5 ; then square down from rake and level, to intersect at D, then from this point draw the curve and width, and you have the convex, and by the process shown at Fig. 6 you have the concave moulds for the upper ramp.

Hand-Railing.

GEO. W. LONGSTAFF.

PLATE C shows a method of laying down the rail for a flight of circular stairs. Fig. 1 shows the plan of cylinder with risers cutting round the centre of rail and tangents ; the joints are located at A, B, C, and D, making four pieces ; the two wreaths from A to C are alike, and only one mould is required.

The rail is one pitch from E to A. Fig. 2 shows the elevation of steps and risers for first wreath, and Fig. 3 the landing wreath ; these are drawn in the same manner as shown in previous plates, making the width of treads correspond with the points where the risers cut the tangents in Fig. 1 ; these elevations also give the exact height as shown ; the first wreath, Fig. 2, is lifted for the newel, and the landing wreath, Fig. 3, runs half a rise above the floor ; the wreaths A B and B C simply rise four risers, and are drawn as shown in Fig. 1. Figs. 4, 5, and 6 show the face moulds and application of the bevels.

Correspondence.

WE invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of Wood-Worker :

I FULLY agree with "Apprentice" in his tirade against guess-workers ; we have too many "rule o' thumb" mechanics in this country, and if our Mississippi friend and the Newark guesser would stick to rules and proper methods, they would find in the end that their work would be speedier and better done. It is science and good practical knowledge mechanics want, not guess-work rules.

R. M. G.

JOHNSTOWN, Pa., April 17, 1879.

Editor of Wood-Worker :

I AM very much pleased with the ILLUSTRATED WOOD-WORKER, and feel sure that if it maintains its present high standard it will be a success in every sense of the word.

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PLATE 36

WALL CABINET.

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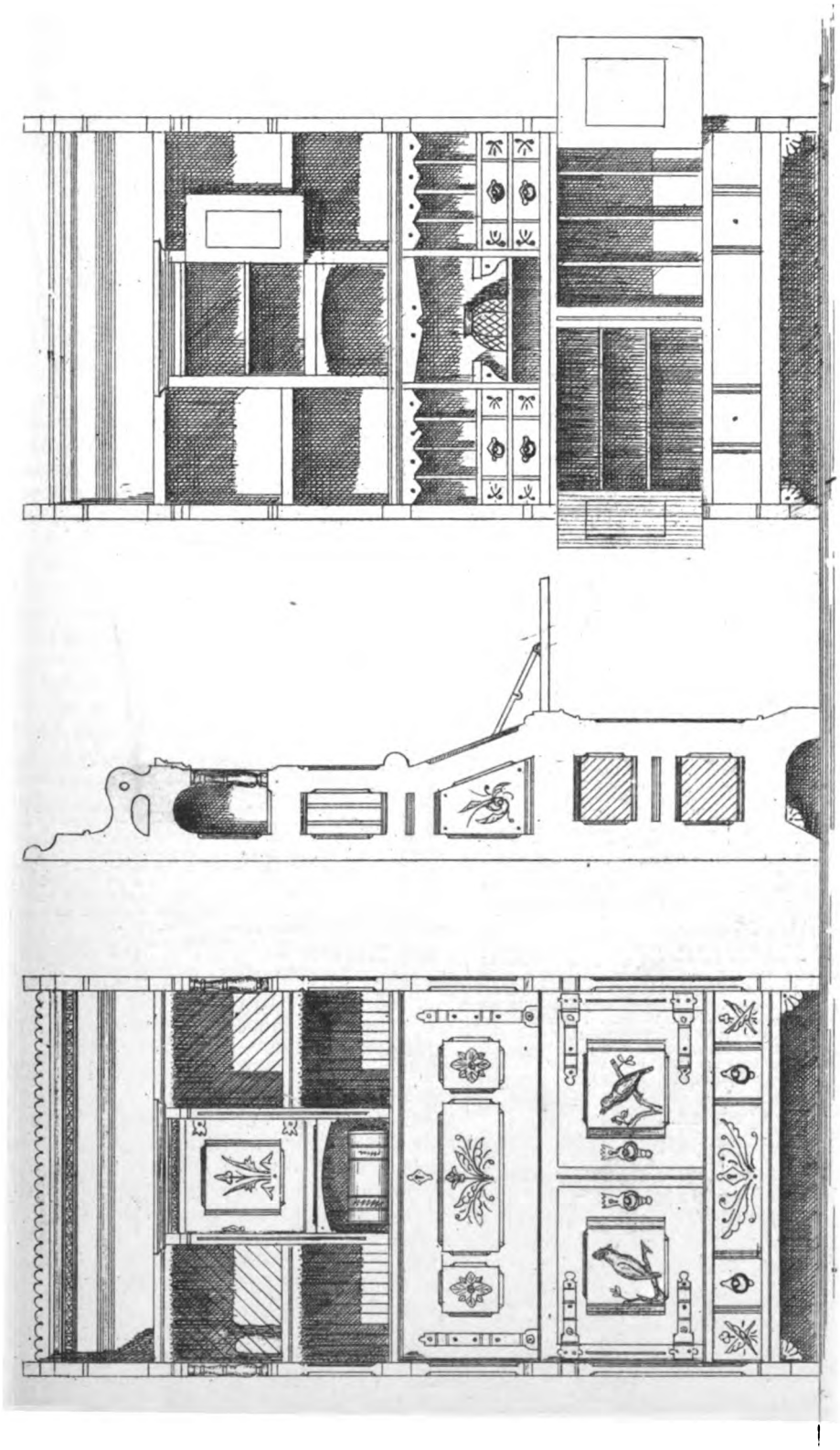
PLATE 37



AMATEUR'S BOOK-CASE AND WRITING-DESK.

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While I admire the style in which it is got up and conducted, I would beg to say that I endorse the suggestions of your correspondent J. A. K. in the March number, with regard to having all plans and elevations drawn to scale. Few workmen can construct anything in correct proportion from the handsome designs published, owing to the want of accompanying scales. P. D.

WALLINGFORD, Conn., April 15, 1879.

Editor of the Illustrated Wood-Worker:

I SEE by a note in your last issue that we are to have a treat from Professor R. Riddell, of Philadelphia, in the way of geometrical lines and their uses. I know his papers will be valuable, and I shall look forward with pleasure to see them, as I owe all my success in hand-railing to Mr. Riddell's valuable works on that subject. I would say to "Apprentice," who asks through your last issue for information regarding the best work on hand-railing, that I have tried all the lines on stair-building that have been published, from Peter Nicolson down to the present date, and find Riddell's system of elevating tangents to give the most satisfaction if properly used, for it always leads to success.

R. M. LAIRD.

JOHNSTOWN, Pa., April 15, 1879.

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

30. STAIR CYLINDER.—Will some reader of the ILLUSTRATED WOOD-WORKER inform me as to the best methods of getting the shape of a stringboard for the cylinder of a flight of stairs, height of riser and width of tread being given?—JACK LEG.

31. TEAK WOOD.—Where does teak wood grow, and what is it used for? Any information on this subject will greatly oblige.—BACKWOODSMAN.

32. MOULDINGS.—Thanks to "Stickingboard" for the explanation he gave in the April number of the WOOD-WORKER regarding the method he adopts to stick circular mouldings. I do not thoroughly see through the method, and would be pleased to see it more fully explained by illustration, if it is not asking too much.—PUZZLED.

33. HOWE TRUSSES.—I would feel obliged to any reader that will inform me how the Howe Trusses are made. I think those who know try to keep the method a secret, for I have worked on Howe bridges for twelve months, and have never been permitted to learn the method.—WM. E. H.

34. COTTAGE.—I would like if Mr. Stuart, of New London, Conn., would answer the following questions regarding the cottage he designed, and which is illustrated on Plate 16, February number of the WOOD-WORKER:

1. Are the stairs boxed or balluster ones?
2. Where the partition is not carried along on the right of chimney, is that intended to be the doorway to cellar (under the stairs)?
3. Is there to be a porch (indicated by the double line) in front, and permanently boarded or covered round?
4. What pitch to roof?
5. Is the plan, as it appears, drawn to the same scale?
6. Are there two windows side by side on each end?—P. D.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur.

18. MIRROR.—Clean the bare portion of the glass by rubbing it gently with fine cotton, taking care to remove any trace of dust and grease. If this cleaning is not done very carefully, defects will appear around the place repaired. With the point of a knife cut upon the back of another looking-glass around a portion of the silvering of the required form, but a little larger. Upon it place a small drop of mercury; a drop the size of a pin's head will be sufficient for a surface equal to the size of the nail. The mercury spreads immediately, penetrates the amalgam to where it was cut off by the knife, and the required piece may now be lifted and removed to the place to be repaired. This is the most difficult part of the operation. Then press lightly the renewed portion with cotton; it hardens almost immediately, and the glass presents the same appearance as a new one.—PILFER.

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19. BENCH.—"Gouge" will find the bench shown on Plate 39 a very complete one. I forward the following description: "The framing is connected by screw-bolts and nuts. The top surface is a thick plank planed very true. It has a trough at *a* to receive small tools, and a drawer at *z*. Two side-screws *c d*, which, with the jaw *e*, constitute a vice for fixing work. An end-screw *g*, and sliding-piece *h*, form another vice for thin works which require to be held at right angles to the position of the other jaw *e*; but its chief use is to hold work by the two ends. Work, when laid on the top of the bench, is steadied by the iron bench-hook *k*, which slides in a mortise in the top, and has teeth at the end which catches the wood. When work would be injured by the bench-hook, the stop *m*, sliding stiffly in a square mortise in the bench-top, serves to stay it. The stop and bench-hook are shown separately, drawn to a much larger scale. There are several square holes along the front of the top, also, at distances apart from each other equal to the motion of the sliding-piece *h*, which has a similar hole. In these bench-holes the iron stop *n* is inserted, and a similar stop is also inserted in the hole in *h*. Thus, any piece of wood whose length does not exceed the distance between the end-hole of the bench and the stop in *h* when it is drawn out to the full extent of its range, may be secured. The face of the stop *n* is slightly roughened. A holdfast *o*, sliding loosely in a mortise, is used in holding square pieces of work on the bench. It is fixed by driving on the top, and released by driving on the back. At *p* is a pin, which is placed in any of the holes shown in the piece in which it is fixed, to support the end of long pieces, which are held by the screws *c d*, at their other extremity. Various improvements in the bench-hooks, stops, and holdfasts have been from time to time suggested, such as making them work by screws; but being in their simple form sufficiently manageable, and the improvements being more expensive, they have not obtained general use. The carpenter's bench is composed of a platform or top, supported on strong framing. It is furnished with a bench-hook at the left-hand end; at which end also the side-board has the screw and screw-cheek, together forming the vice or bench-screw. The side-board and right-hand leg of the bench are pierced with holes, into any one of which a pin is inserted, to hold up the end of any long piece of work clamped in the bench-screw. The length of the bench may be 10 to 12 feet, the breadth 2 feet 6 inches, the height about 2 feet 8 inches. The legs should be 3½ inches square, well braced; front top-board should be 2 inches thick; the further boards may be 1¼ inch. These two benches may be regarded as the opposite extremes of the scale, and between them may be many varieties both in size and in the number of the fittings, as inclination or the necessities of the workman may dictate."—NED.

21. EOLIAN HARP.—I forward a rough sketch (Fig. 7, Plate 35) of an Eolian harp for "Musical," which I think will suit him. To construct one he should begin by making a box, with the top, bottom, and sides of thin wood, and the ends of 1½ in. beech; form it the same length as the width of the window in which it is to be placed. The box should be 3 in. or 4 in. deep, and 6 in. or 7 in. wide. In the top of the box, which acts as a sounding-board, make three circular holes, about two inches in diameter, and an equal distance apart. Glue across the sounding-board, about 2½ in. from each end, two pieces of hard wood ¼ in. thick and ½ in. high, to serve as bridges. Procure from any musical instrument maker twelve steel pegs, similar to those in a piano, and twelve small brass pins; these you must insert in the ends of the box—that is, in the beech, as shown in the sketch. Finish one end first, commencing with a brass pin; then insert a steel peg, and so on, placing them alternately ½ in. apart to the number of twelve. Now for the other end, which you must commence with a steel peg (exactly opposite the brass pin at the opposite end), then a brass pin, and so on, alternately, to the number of twelve; by this arrangement you have a steel peg and a brass pin always opposite each other; this is done so that the pressure of the strings on the instrument shall be uniform. Now string the instrument with twelve first violin strings; make a loop at one end of each string, which put over the brass pins, and wind the other round the opposite steel peg. Tune them in unison, but take care that the strings be not drawn tight. If you should desire to increase the current of air, place a thin board about two inches above the strings, which can be supported at each end by two pieces of wood; place the instrument in a partly opened window, and to increase the draught open the opposite door.—AMATEUR.

21. EOLIAN HARP.—The sketch (Figs. 8 and 9, Plate 35) gives a simple Eolian harp, with four wires. The box should just fit the window where you want to use it. Make a box of pine, the full width of window, about 4 in. wide, 3 in. deep, of ½ in. stuff; fasten with glue and screws. A hard wood block, about 1½ in. square, in which the four iron pegs—like those in a piano—are to be put. The wires to be of steel, running from peg to peg, and tuned either to major or minor chords. This can be done from a piano. The lid and box are made concave, to admit the rush of air.—CURIOUS.

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PLATE 38

FIG. 1.

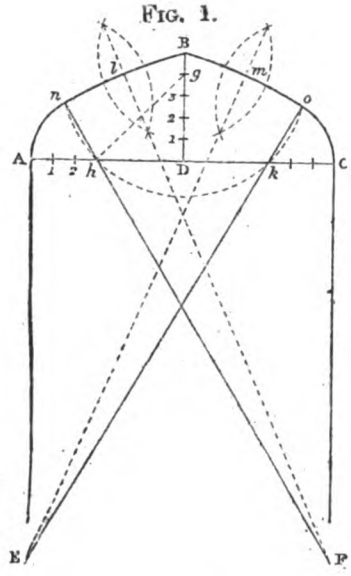


FIG. 5.

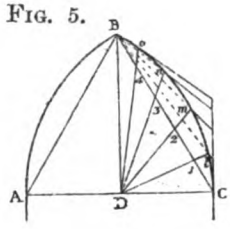
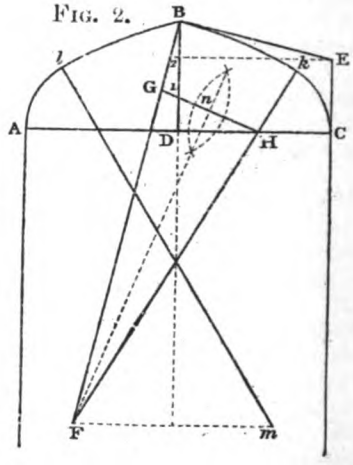


FIG. 2.



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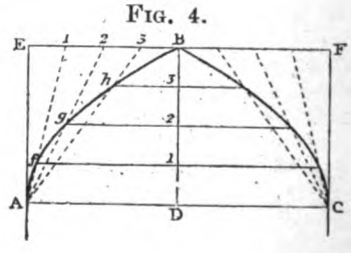


FIG. 3.

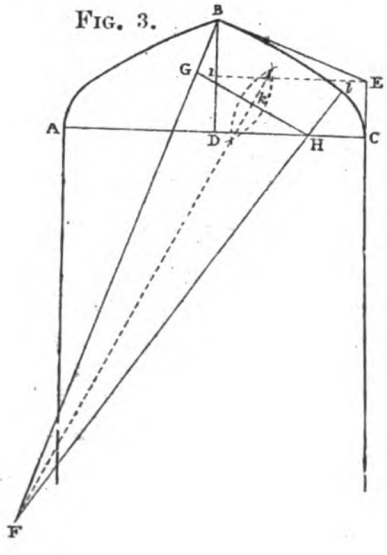


FIG. 6.

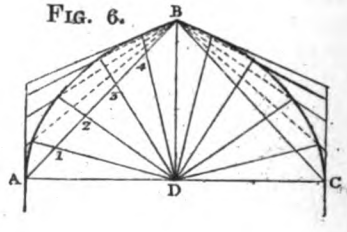


FIG. 7.

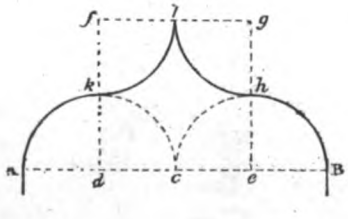


FIG. 8.

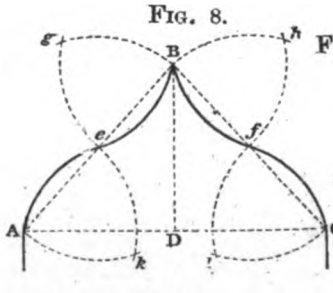
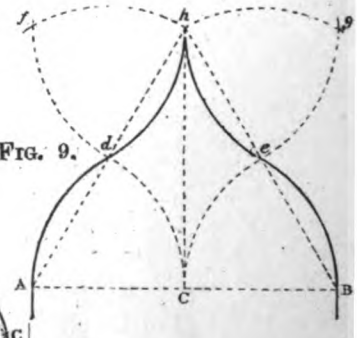


FIG. 9.



PRACTICAL CARPENTRY.

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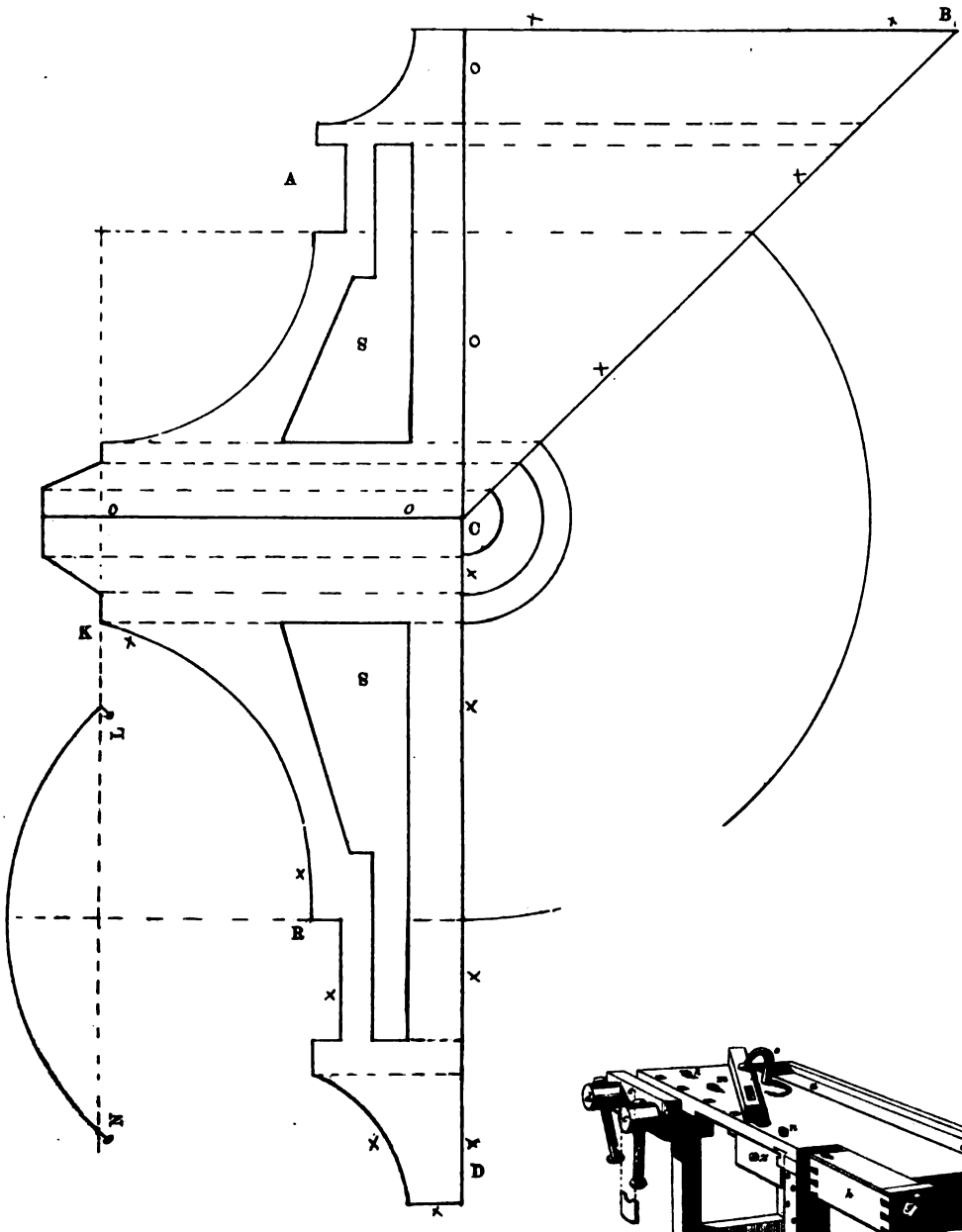
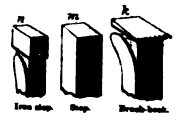
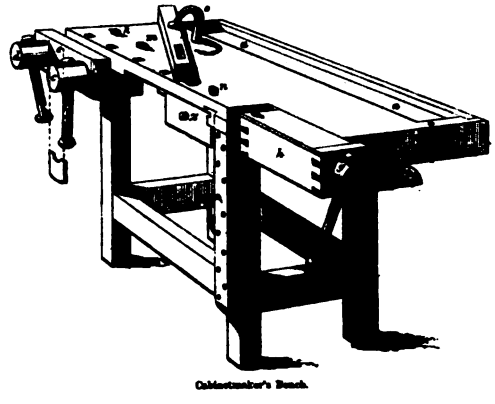
PLATE 39







LESSONS IN PROJECTION

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22. HAND-RAILING.—"Balluster" should first get a copy of the "Artisan," by Robert Riddell, and after mastering its contents he will have acquired a fair knowledge of the principles of hand-railing. He should then obtain a copy of "New Elements of Hand-railing," by the same author. These two works will give him more information on the science of hand-railing, with less study, than all other works on the art published.—PRACTICAL STAIR BUILDER.

22. HAND-RAILING.—I have used the "American Stair-Builder's Guide," by L. D. Gould, and found it all I could desire. It is plain, yet comprehensive, as it shows how to get lines for almost all kinds of stairs. It is cheap, only costing three dollars. I have tried Monkton's and Cupper's works, but I must say that for a new hand I think Gould's book is far the best.—MODEST.

23. SCALE.—The divisions shown on the square that appear so mysterious to "Steel Square" are simply an octagon rule. The way to work them is as follows: Suppose a stick of timber, ten inches square, take a centre line five inches; set a pair of compasses, putting one point on any particular division, and the other point on the tenth subdivision. This distance marked off from the centre line on each side will give the points for the gauge lines. Gauge from the corners both ways, and you will have the lines for an octagon.—WM. E. HILL.

23. SCALE.—In answer to "Steel Square" I may say the scale on the tongues of squares he is perplexed over is called the octagonal scale, and is used in this way: If you have a stick ten inches square which you wish to dress up octagonal, make a centre mark on each face, then with the compasses take ten of the spaces marked by the short cross lines in the middle of the scale, and lay off this distance on each side of the centre lines. Do this at the other end of the stick, and strike a chalk-line through these marks. Dress off the corners to these lines, and the stick will be octagonal. If the stick is not straight, it must be gauged, and not marked with the chalk-line. Always take a number of spaces equal to the square width of the octagon in inches. This scale is used by millwrights, and is very simple and expeditious, especially on very large timber; but on small sticks the old rule of seven inches and seventeen inches is preferable. If this is not explicit enough to "Steel Square," I will give a diagram illustrating the matter, at any time, in the WOOD-WORKER.—TUBAL CAIN.

[We have received several other answers to this "query," but deem the ones offered ample and reliable.—ED.]

24. CIRCULAR SAW.—"Mechanic" can make his saw plough by using wooden washers that are made thin on one edge and thick on the other. Make the washers as follows: Take two pieces of pine four inches square and half an inch thick. Bore a hole through each one in the centre the size of the saw mandril, then make each piece like a wedge, leaving the thin end about a quarter of an inch thick. After this is done, make the washers round, leaving them about the same diameter as the metal washer on the mandril. Then, to adjust them for work, you first take off the metal washer and saw, and put on one of the wooden washers, with the thin edge up; then put on the saw, then the other wooden washer, then the metal washer, and lastly the nut, which must be screwed up pretty solid. It will be seen that the saw does not sit at right angles to the mandril, and by trying it on a piece of stuff it will be found out how much the saw is out of truth; and if it is more than the width of the required groove, it can be reduced by changing the positions of the wooden washers. This method of adjusting a circular saw is called by some "wobbling the saw." Care must be taken not to crowd the saw when cutting grooves, or they will be narrower in some places than they ought to be, owing to the springing of the saw.—MANDRIL.

25. SPRING AND PLUMB BEVEL.—If "Apprentice" will have patience for a little while, he will have all the things he inquires about fully explained in the papers now being published in the WOOD-WORKER.—AN ADMIRER OF THE SECTORIAN SYSTEM OF HAND-RAILING.

27. AREA.—The area of the cylindrical ring can be ascertained by two methods, thus:

1. Multiply difference of squares of internal and external diameter by the decimal ·7854. This will give required area. Example: Let the inner diameter be 8 and the outer one 16; then we have: $16^2-8^2=256-64=192\times\cdot7854=150\cdot7968$.

2. Multiply the mean of the inner and outer circumferences by the width of ring, which in this case is 4, and we find the same result. Example:

$3\cdot1416\times16=50\cdot2656$
$3\cdot1416\times\ 8=25\cdot1328$

$75\cdot3984$

Mean $=37\cdot6992\times4=150\cdot7968$

as before. —P. D.

27. OIL.—I have used Virginia Amber Oil in my factory for many years, and think it the best and most economical in the market. I employ twenty-three hands in my shop, and have a full complement of wood-working machinery, and have yet to hear of the first complaint regarding the oil used.—OBSERVER.

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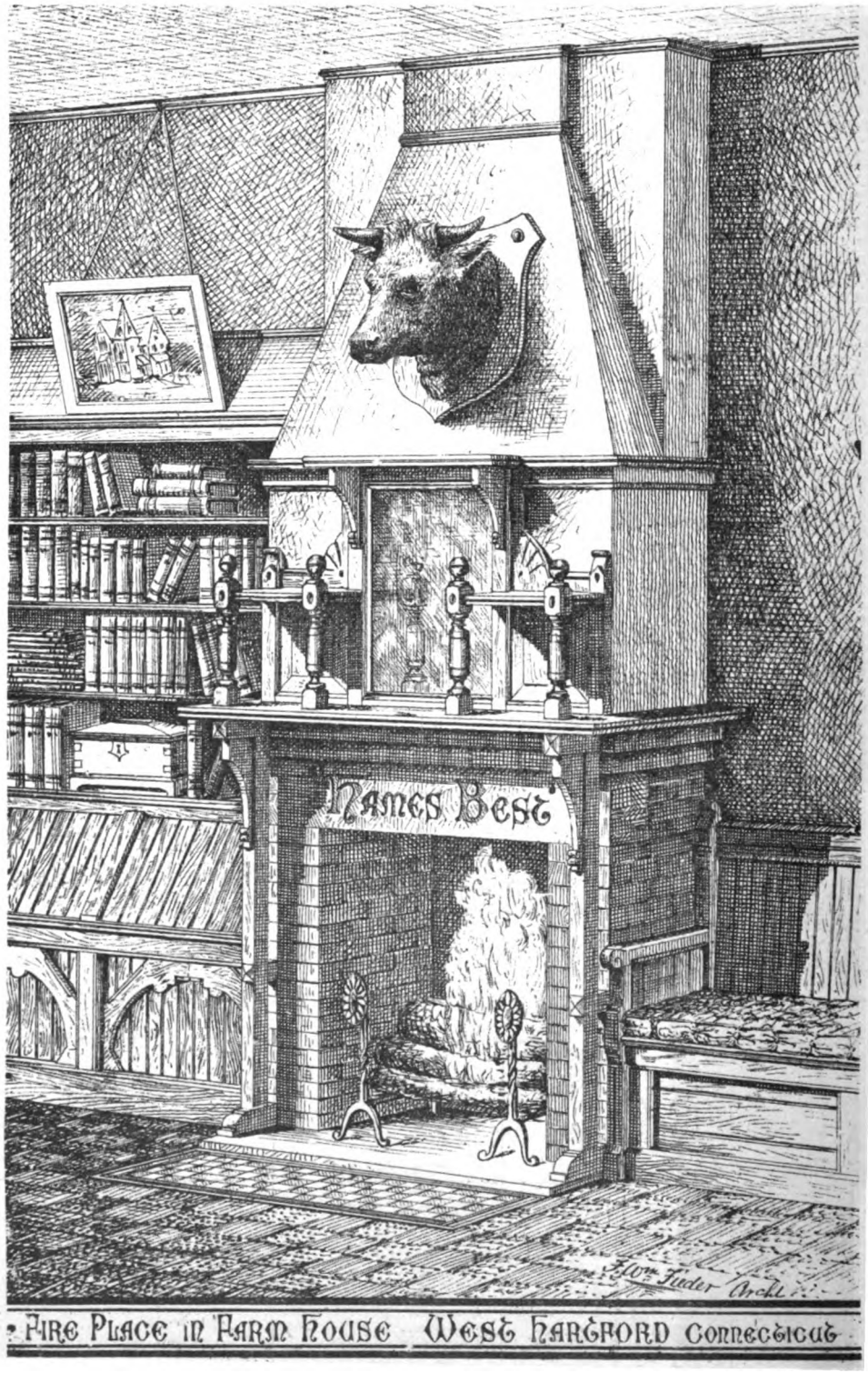
PLATE 40



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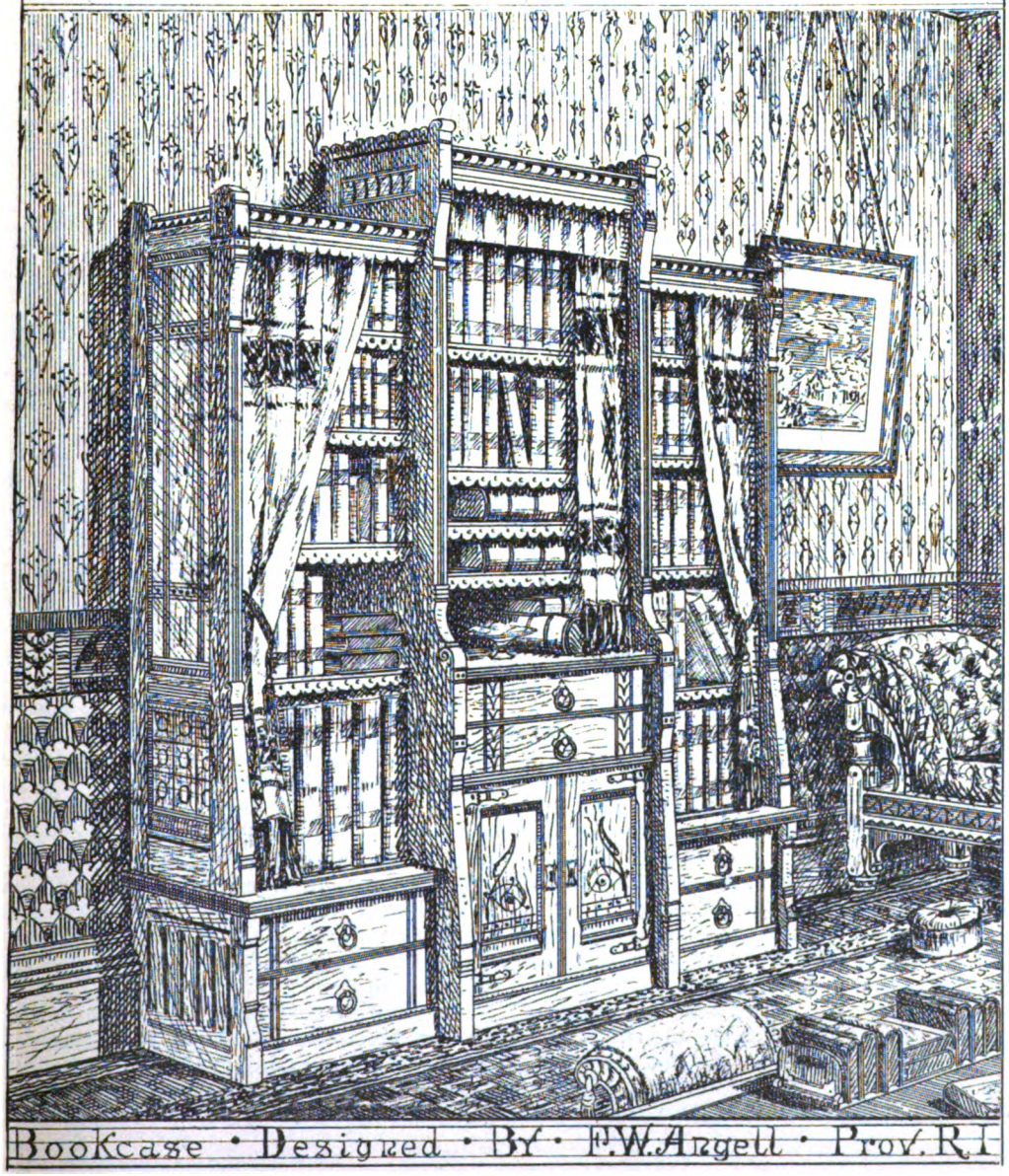

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ILLUSTRATIONS.

Bookcase; Hand-Railing; Carpentry; Subscribers' Problems; Altar; Bay-Window; Projection; Table and Washstand; Studies for Amateurs.

Our Illustrations.

OUR readers will notice that our illustrations this month are very fine and suggestive, most of the designs being of such a nature that both the skilled workman and the amateur may find something in them that is easily understood and readily constructed.

The book-case on the title-page is designed to be built of black walnut, with drawer and door trimmings of polished brass. The shelves are movable, and are trimmed with embossed leather and brass nails. The drapery which slides upon a rod behind the cornice is of an amber color, trimmed with fringe, and bands of raw silk and black cloth.

The extreme width is five feet six inches; upright divisions one and three eighths inches; centre space, two feet wide inside; height of centre portion to top of cornice, six feet two inches; height of wings, six inches less. Height of shelf above drawers in centre, two feet six and a half inches, at wings, fourteen and a half inches.

Plate 42 is illustrative of two lessons on the Sectorian System of Hand-Railing. Explanations are given elsewhere.

Plate 43 shows six lessons in Practical Carpentry in the first section, and a number of problems from our subscribers in the second section.

Plate 44 shows the altar and screen we promised our readers some time ago. This handsome piece of work was recently executed for St. Peter's Church (R. C.), Rosendale, and was designed by Arthur Crooks, Architect, Trinity Buildings, New York, who was also architect of the Church, which was illustrated in the AMERICAN BUILDER some years ago.

The altar is of white pine, the table being fifteen feet long, and three feet five inches from the platform to the shelf. The tabernacle and canopied niche over the same, stand out complete from the reredos, which connect this central feature with the niche on each end of the altar, and which are intended to contain statues. The height from the sanctuary floor to the top of cross over central canopy, is nineteen feet. The altar stands out three feet from the rear wall of the sanctuary, and a screen extends from each end of the altar to the side walls.

In this instance the reredos and screens are painted white, although they are susceptible of being made very rich and ornate by polychromatic decoration.

We are sure this design will be appreciated by our readers for its simple beauty and chasteness.

Plate 45 shows the front and side elevations of a square bay-window. This design is drawn to a scale which is given on the lower part of the plate. This design is intended to be executed in oak, finished in oil, and was originally designed to be attached to a brick building.

On Plate 46 we give another of those practical lessons in Projection, by Robert Riddell, that are so instructive to the young mechanic. Description and explanations will be found elsewhere.

On Plate 47 we show two very nice designs —a study table, and a washstand. The study table is simple in detail and construction. Its putting together is obvious, and will not puzzle any clear-brained person, mechanic or amateur. The books scattered below are friendly, and always within reach.

The washstand is easily constructed, and will be handy for many a home, simple as it is.

Plate 48 contains four excellent studies for amateurs. They are for simple, but very useful pieces of furniture.

The hanging shelves and the plain bracket are fine specimens of simple workmanship, and any one possessing ordinary constructive ability should be able to make either of the two without much difficulty.

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Stray Notes.

We are sure our patrons will appreciate our efforts this month, in providing for them so many original designs of such an excellent character as the ones we publish in the present issue. We particularly call attention to the design of a square bay window, shown on Plate 45. It is simple, plain and effective; but its best feature rests in the fact that it is to be built of domestic wood and finished in oil. For years past woodwork has been so plastered over with paint, and joiners and house-finishers have been so driven and hurried, that slip-shod work of the most infamous kind, with joints full of putty or glue and sawdust, and plane marks and scratches meandering all over it like rivers, or mountain ranges on a map, all of which are covered or hidden to a certain extent by a daub of paint, has become the rule, and one rarely finds good work under paint, unless the work was originally intended to be finished in oil.

Dishonest work does not exist from lack of skill in our mechanics, or from a want of knowledge of its existence by the contractors or builders, but simply because greed is at the bottom of it all; greed, first in the proprietor, who wishes his work done for less money than it is possible; greed in the contractor, who, through the efforts of unscrupulous competition, is obliged to grind down his men to starvation wages in order to make for himself the usual profits: and the employee, the man who does the real work, has no heart in what he does, his skill is wasted or unappreciated, and he is driven by surrounding circumstances to get through as much work as possible in a given time, with the least possible effort of hand or head.

If paint, particularly for inside work, was tabooed altogether, slop work in joinery and inside finishings in wood, would soon disappear and honest substantial work would take its place.

We have had so great a demand for the cheap drawings advertised in our last issue, that most of the numbers mentioned were sold out by the middle of the month. We have a few odd numbers left which are advertised in another column.

If "Ah Paradice," of San Francisco, will forward his name and address to this office, we shall be pleased to communicate with him on the matter mentioned in his letter of the 21st April.

We have received a number of letters to which no names were attached, some of them containing very useful items, but which we could make no use of for lack of the name of the writer. It is simply a waste of time, paper, and postage, to send unsigned communications to this office.

The Sectorian System of Hand-Railing.

SIXTH PAPER.

Plate 42, section 1, exhibits a plan of stairs with two platform landings and two quadrant wreaths, with two flyers intervening. Where it is desirable to avoid a large cylinder, and the width too great for the length of the steps, this plate shows the best method of overcoming the difficulty. It will be observed that by the use of the quadrant wreaths, the size laid down, which is just the rise of one step each, the rail is made straight from bottom to top, each wreath being the rise of one step. Fig. 1 shows this.

Fig. 2 shows the wreath piece with spring and plumb bevel, giving the twist of rail, and by reversing, will give both pieces of wreath.

Fig. 3 is the elevation, showing the length of wreaths and straight rail with skirting facia.

The newel is placed where it is, to show its relation to the rail, only the centre line being used to show the ramp of rail. The dotted lines show the relation of the plan to the elevation.

Section 2 exhibits a plan for a circular stairs in very common use, with a new mode of framing for the same. I have used it in my practice, and found it to be the strongest and at the same time the most simple to construct of any other kind, and hence I have no hesitation to recommend it.

The horse pieces for these stairs will be shown, laid out, figured, and fully described, next month.

Practical Carpentry.

Plate 43. *Fig.* 1.—*To draw the sections of a cone made by a line cutting both its sides.*

Let A D B be the vertical projection of the cone, A C B the horizontal projection of half its base, and E F the line of section. From the points E and F, let fall on A B the perpendiculars E G, F H; and on G H describe the semicircle G 4 H, which is the horizontal projection of half of the section. To find the vertical section—Divide the semicircle G 4 H into any number of equal parts, 1 2 3 4, etc.; and through these divisions draw lines 1 5 K, 2 6 *l*, 3 7 *m*, 4 8 *n*, perpendicular to the line A B, and meeting the section line E F in the points *k l m*, etc. Through *k l m*, etc., draw *k t*, *l u*, *m v*, *n w*, perpendicular to E F, and make them respectively equal to the corresponding ordinates, 5 1, 6 2, 7 3, etc., of the semicircle G 4 H, and points will be obtained

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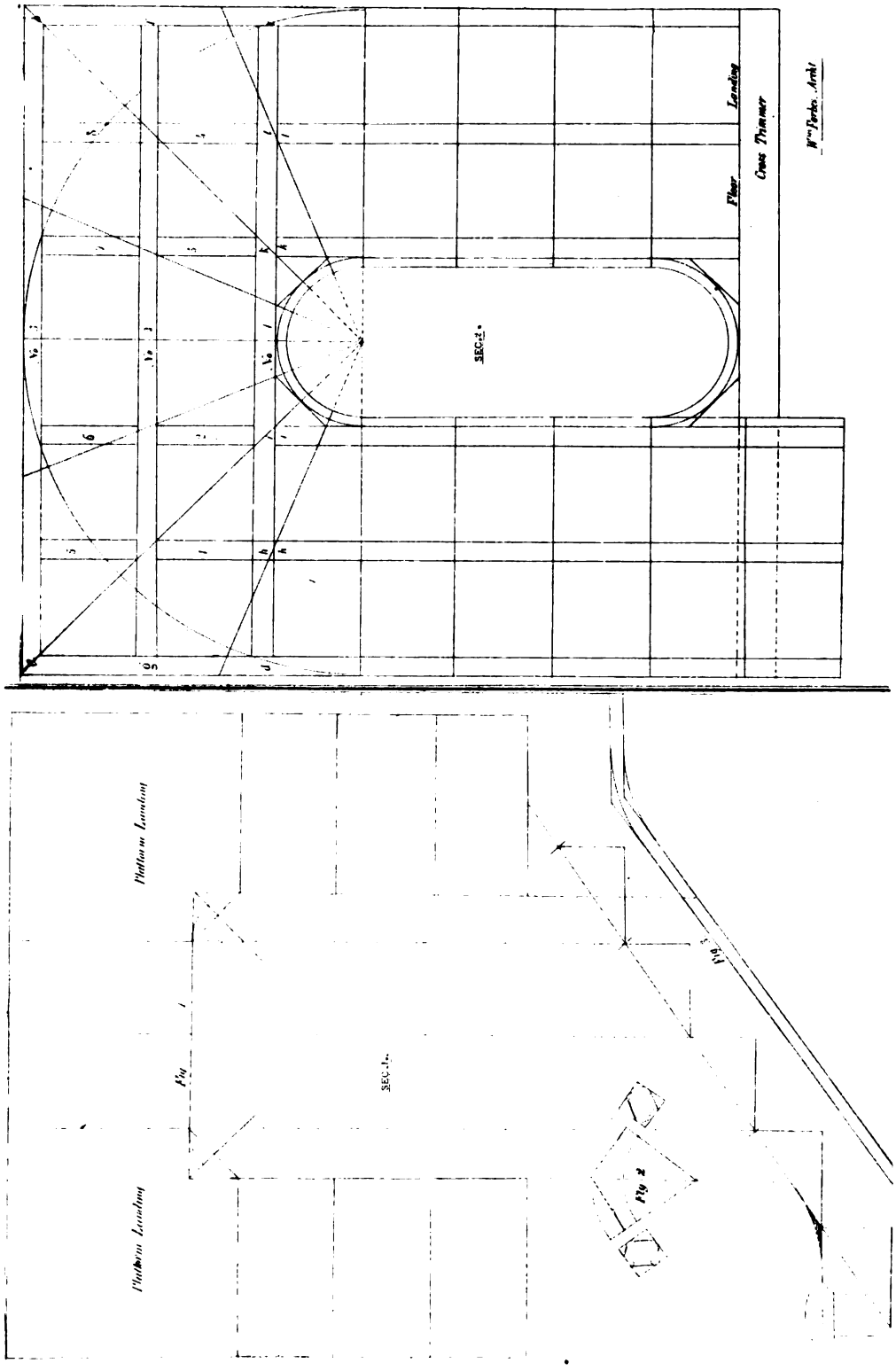
PLATE 42



THE SECTORIAN SYSTEM OF HAND-RAILING

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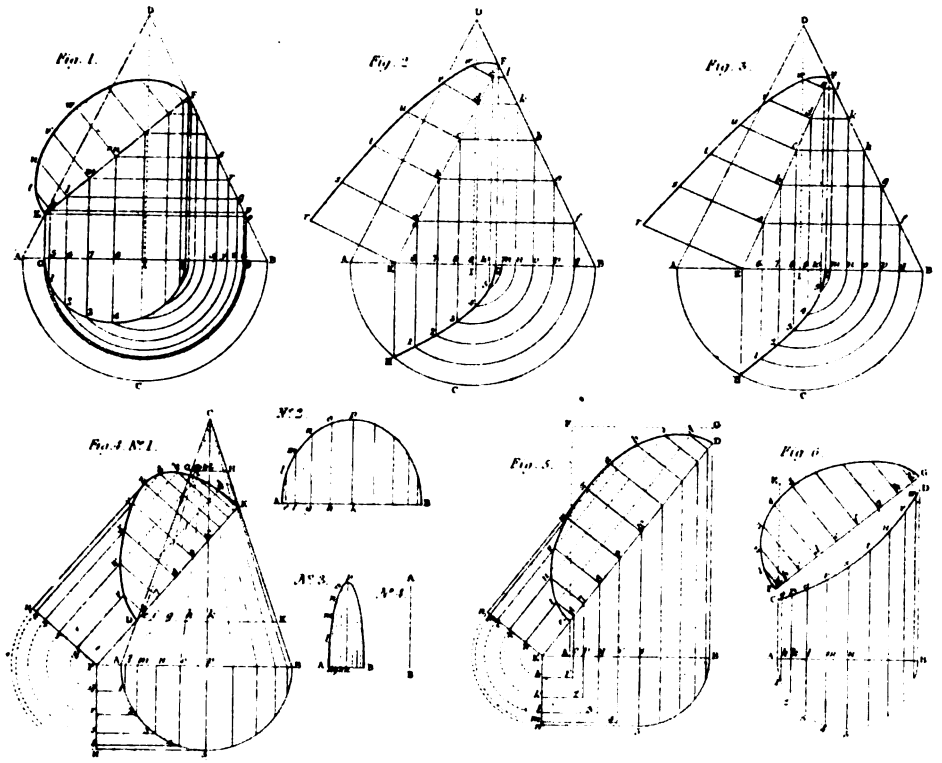
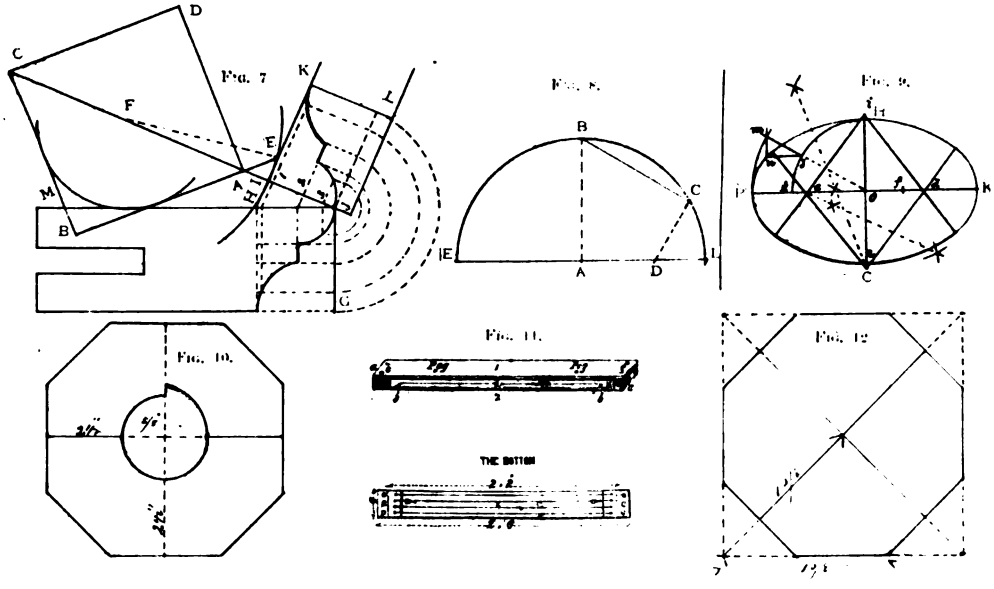
PLATE 43



PRACTICAL CARPENTRY.



SUBSCRIBER'S PROBLEMS.

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through which the ellipse E *w* F may be traced. It is obvious that, practically, it is necessary only to find the minor axis of the ellipse, the major axis E F being given.

If through the points E *k l m n*, etc., lines be drawn parallel to A B, etc., meeting the side of the cone, as in *o p q r s*, and from these perpendiculars be let fall on A B, in *x y z a b*, then arcs described from the centre of the base of the cone I, with the radii I G, I 1, I 2, will meet these perpendiculars. This is applied in the two following figures, to finding the projections of other sections of the cone.

Figs. 2 and 3.—*To draw the sections of a cone made by a line parallel to one of its sides.*

Let A D B be the vertical projection of a right cone, and A C B half the plan of its base; and let E F be the line of section. In E F take any number of points, E *a b c d e* F, and through them draw lines E H, *a* 6 1, *b* 7 2, etc., perpendicular to A B. Through *a b c d e*, draw also lines parallel to A B, meeting the side of the cone in *f g h k l*: from these let fall perpendiculars on A B, meeting it in *m n o p q*. From the centre of the base I, with the radii I *m*, I *n*, I *o*, etc., describe arcs cutting the perpendiculars let fall from the section line in the points 1 2 3 4 5; and through the points of intersection trace the line H 1 2 3 4 5 G, which is the horizontal projection of the section. To find the vertical section—On E *a b c d e*, raise perpendiculars to E F, and make them respectively equal to the ordinates in the horizontal projection, as E *r* equal to E H, *a s* equal to 6 1, etc., and the points *r s t u v w* in the curve will be obtained.

Fig. 4, Nos. 1–4.—*To draw the section of a cuneoid made by a line cutting both its sides.*

A cuneoid is a solid ending in a straight line, in which, if any point be taken, a perpendicular from that point may be made to coincide with the surface. The end of the cuneoid may be of any form; but in architecture it is usually semicircular or semi-elliptical, and parallel to the straight line forming the other end.

Let A C B (No. 1) be the vertical projection of the cuneoid, and A 5 B the plan of its base, and A B (No. 4) the length of the arris at C, and let D E be the line of section.

Divide the semicircle of the base into any number of parts 1 2 3 4 5, and through them draw perpendiculars to A B, cutting it in *l m n p o* and join C *l*, C *m*, C *n*, etc., by lines cutting the section line in 6 7 8 9, etc. From these points draw lines perpendicular to D E, and make them equal to the corresponding ordinates of the semicircle, either by transferring the lengths by the compasses, or by proceeding as shown in the figure.

The section on the line D K is shown in No. 2, in which A B equals D K; and the divisions *e f g h k* in D K, etc., are transferred to the corresponding points on A B; and the ordinates *e l*, *f m*, *g n*, etc., are made equal to the corresponding ordinates *l* 1, *m* 2, *n* 3, of the semicircle of the base. In like manner, the section on the line G H, shown at No. 3, is drawn.

Fig. 5.—*To describe a cylindric section through a line given in position.*

Let A B G F be a section of a right cylinder passing through its axis; and let C D be the line of the required section. On A B describe a semicircle, and in the arc take any number of points, 1 2 3 4 5, from which draw lines perpendicular to A B, cutting it in *o p q r s*, and produced to meet the line of section C D, in the points 6 7 8 9 10, etc. From these points draw the lines 6 *t*, 7 *u*, 8 *v*, 9 *w*, 10 *x*, etc., perpendicular to C D, and make these ordinates respectively equal to the ordinates *o* 1, *p* 2, *q* 3, *r* 4, *s* 5; then through the points C *t u v w*, etc., draw the curve, which will be the section required. The heights of the ordinates may be simply transferred by the compass, or thus:—Produce the line of section C D to E, to meet the diameter A B produced: draw E *n* perpendicular to E D, and E *n* perpendicular to E B. From the points in the arc 1 2 3 4 5, draw lines 1 *h*, 2 *k*, 3 *l*, 4 *m*, 5 *n*, meeting the line E *n*; then with the centre E and radii E *h*, E *k*, E *l*, E *m*, E *n*, describe the arcs *h h*, *k k*, etc., and from the points *h k l m n*, where these arcs meet the line E *n*, draw the lines *n x*, *m a*, *l b*, *k c*, *h d*, cutting the ordinates 6 7 8 9 10, etc., in the points *t u v w x a b c d*, through which draw the curve of the required section.

Fig. 6.—*To describe the cylindric section made by a curved line cutting the cylinder.*

Let A B D E be the section of the cylinder, and C D the line of the section required. On A B describe a semicircle, and divide it into any number of parts as before. From the points of division draw ordinates 1 *h*, 2 *k*, 3 *l*, 4 *m*, etc., and produce them to meet the line of the section in *o p q r s t u v w*. Bend a rule or slip of paper to the line C D, and prick off on it the points C *o p q*, etc.; then draw any straight line F G, and unbending the rule, transfer the points C *o p q*, etc., to F *a b c d*, etc. Draw the ordinates *a* 1, *b* 2, *c* 3, and make them respectively equal to the ordinates *h* 1, *k* 2, *l* 3, etc., and through the points found trace the curve.

Lessons in Projection.

BY ROBERT RIDDELL, TEACHER OF THE ARTISAN CLASS IN THE HIGH SCHOOL, PHILADELPHIA, PA.

FIG. 1, Plate 47, shows the plan of a variformed figure; all its members are formed

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with straight lines, with the exception of the curve at its extreme end. The line of projection shown by the angle A B and the intersecting members are given on Fig. 2 in the same plate. These lines when raised to position will stand directly over those of the plan, so that members of both are seen to range exactly with each other.

It will be noticed that the member on Fig. 2, marked D, is much wider than the corresponding member, J, on the plan Fig. 1. This teaches a lesson which may be of great service in many ways to the student who thoroughly masters the problem; to some workmen this simple solution may seem a small matter, but to those who think and who understand its application it will be found to be a matter of great importance in constructive art.

By a proper application of the foregoing problem, many works that appear difficult of execution and complicated in their nature may often be reduced to such a stage of simplicity that any ordinary mechanic will be able to understand them without effort.

If the student will draw this figure on a piece of cardboard, then cut the cardboard through on the lines marked *x x x x*, and fold it over on the lines marked *o o o*, laying the point C on the point A, he will have at once a practical application of the rule, and he will understand without further explanation the great utility of the problem.

The spaces marked *s s* are cut out to give a better idea of the working of the rule.

Correspondence.

We invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of the Wood-Worker:

I SEND you the following method, which I think is new, for obtaining the stretchout of a circle: Set your compasses at A, Fig. 9, Plate 43; draw one half of a circle; draw the base line E L, and the perpendicular line A B. Set your compasses at B, and describe the circle C; put your right angle on the semicircle at B and C; then intersect the base line at A, and from D to E you have the length of the stretchout of one fourth of the circle.

G. H. VAN PATTEN.

IOWA CITY, IOWA.

Editor of the Illustrated Wood-Worker:

THE following is a method of describing an oval, which I am sure will prove useful to many of your readers: Draw P K, Fig. 9, Plate 43, equal to intended length of oval; bisect P K by c *i* at right angles, making *O L* and *O* H each equal to half the breadth of oval; then describe quarter-circle *g J* H with *O* as a centre; make *g J* one third of quarter-circle, and draw *O J m*; on *O* as centre, with *o* P as radius, strike arc intersecting at *m*; draw *J n* parallel to P K and *m n* to C H: now *n* will be a true point for a mathematical curve. On *n* and H make intersections as shown, through which draw dotted lines cutting *L* H at c, which is one centre. Take radius c H and set it from P to *f*; then on *f* and c make intersecting arcs through which find centre *e*; draw c *e* produced towards *n*, thus determining the limits of the arcs comprising one quarter of the oval.

W. H. C.

ORILLIA, ONT., May 16, 1879.

Editor of the Wood-Worker:

IN the May number of the WOOD-WORKER, Plate 39, I find it easy to understand all the lines in projection without referring to the explanations, with the exception of the elliptical curve, for which no rule to obtain is given on the plate. Will Mr. Riddell or some of your advanced readers explain how the two foci for the ellipse are found?

S. P.

FULTON, N. Y., May 12, 1879.

[S. P. will find the ellipse and some of its qualities fully described in the March number of the WOOD-WORKER.—ED.]

Editor of Wood-Worker:

I FORWARD you a drawing of a carpenter's gauge-head (shown on Plate 43, Fig. 10) which requires no thumb-screw, wedge, or other fastening, only requiring to be turned off the centre slightly to be made fast on the gauge stem. This will be new to many of your readers. It can be readily understood from the drawing, and any carpenter can make a pair of gauges for himself in this style in less than an hour.

I also forward a simple method, though not a new one, for obtaining an octagon. The drawing (Fig. 12, Plate 43) explains itself.

F. W. H.

ST. LOUIS, MO., April 27, 1879.

Work and Pleasure.

IT is not uncommon for those who have much work to do to complain that they have little or no time for enjoyment. This is especially true of the young. The very name of play or pleasure has a magical transforming power. That name makes toilsome pastime a delight; while the idea of work often makes the easiest task seem oppressive. It is not to be denied that there is wisdom in proper recreation and diversion for the laborer. They are necessary to keep up the

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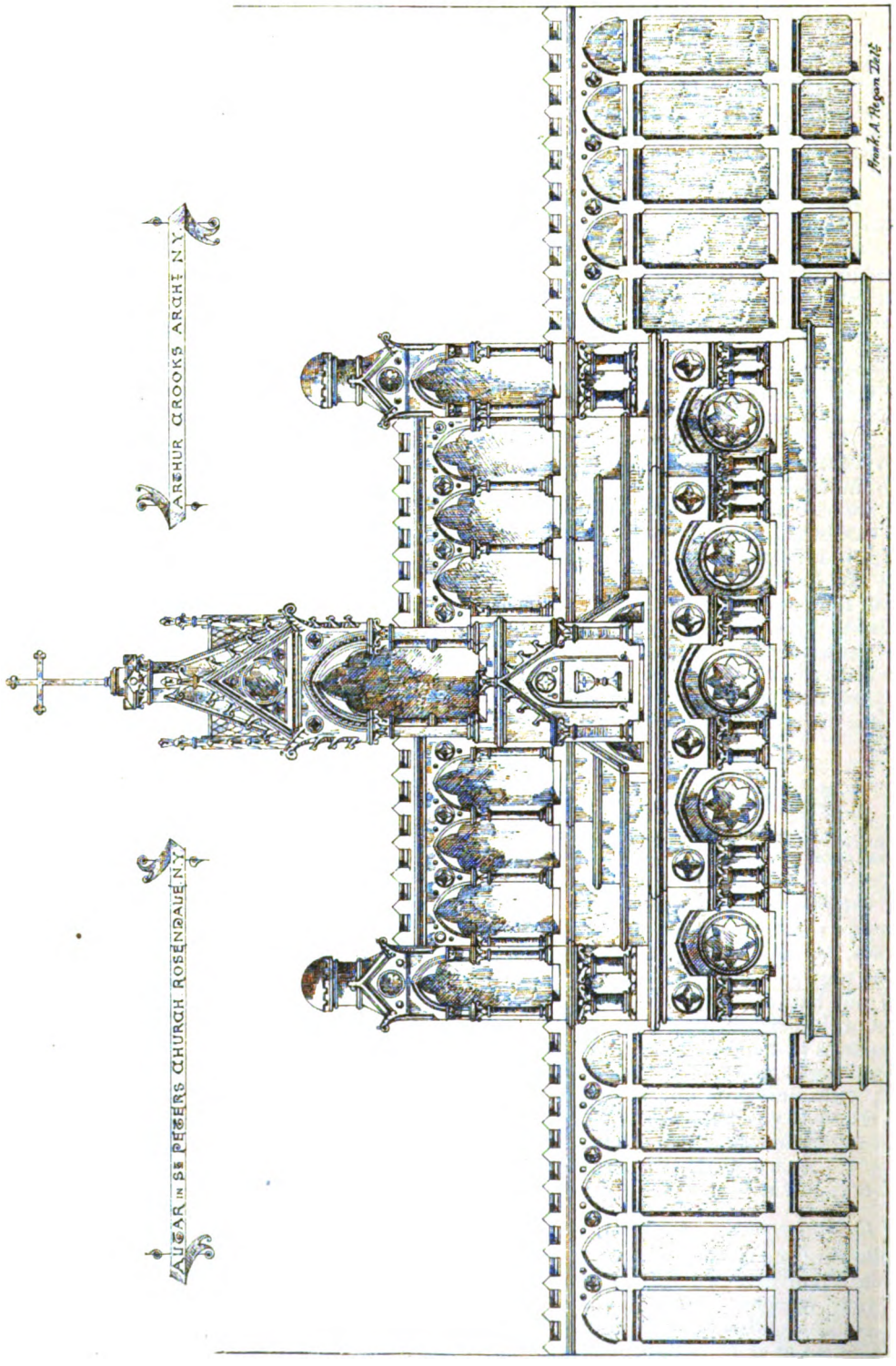
PLATE 44



ALTAR, ST. PETER'S CHURCH,

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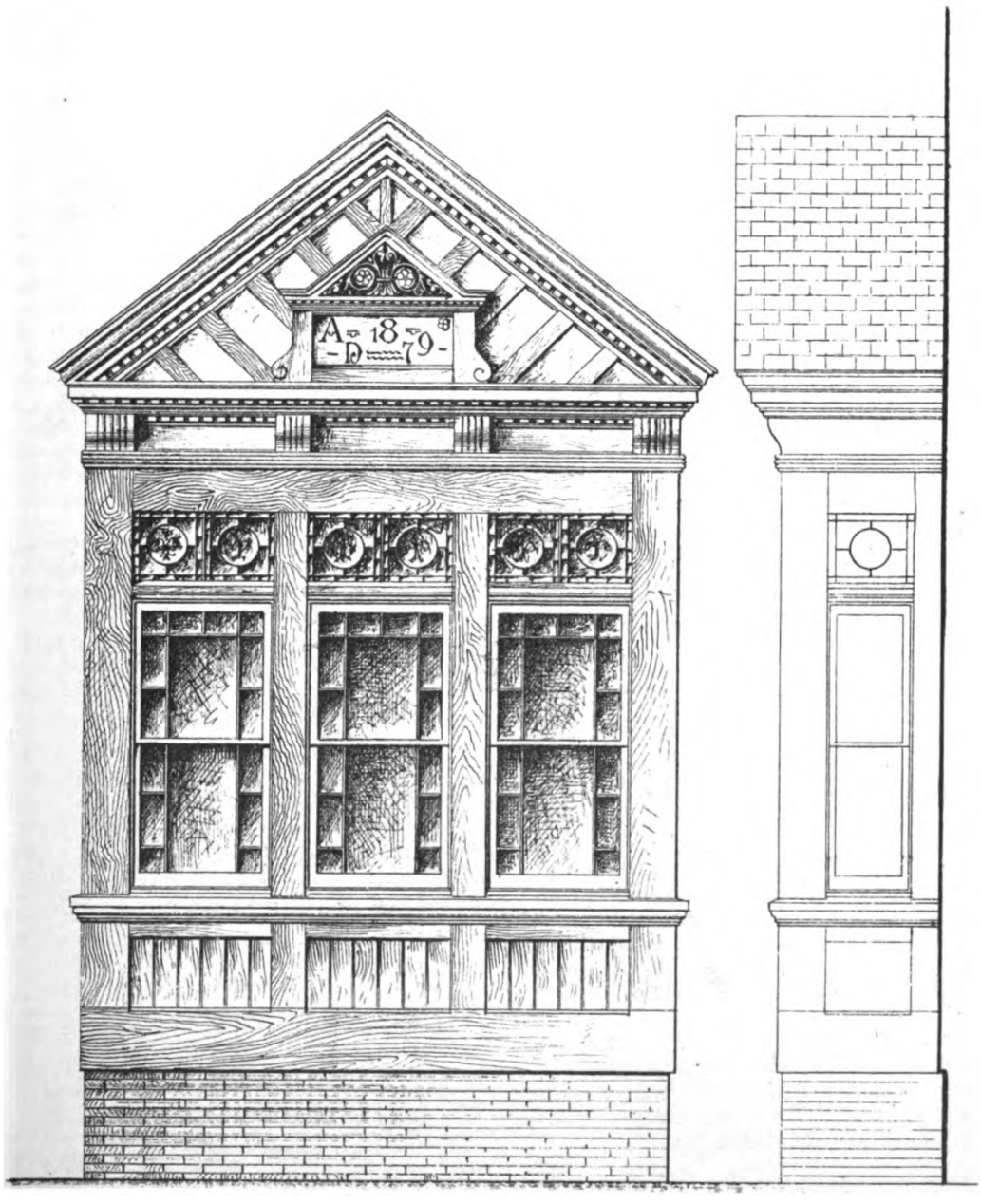
PLATE 45



Scale.

SQUARE BAY WINDOW

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spirits and maintain somewhat of the charm of freshness in one's occupation, whatever it may be. It is well, now and then, to "lay down the shovel and the hoe," and turn the mind away to the quiet scenes of the home, and to the exhilarating pleasures of a holiday.

But very unfortunate are they—young or old—whose real enjoyment is limited to those rare occasions when work is for a while relinquished, and so-called pleasure is sought in exraordinary ways. Now we are so constituted that, under the law of habit and the peculiar effect of conscious usefulness and promising engagements, we may come to love our work, and find in its legitimate prosecution the very essence of contentment, hope and joy. To work with the right purpose and in the right way, is to convert work into pleasure. What a fortune is possessed by the man that has attained to that desirable experience! His work-days are more than holidays; for they add to the pleasure of the common holidays the cheering assurance of gain and progress.

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

35. PLOUGH.—I shall be obliged to any of my fellow readers who will be kind enough to inform me where I can procure one of Phillip's Plough Planes.—JOHN R. D.

36. SAWS.—Can you or any of your readers tell me how to fasten emery on a wooden wheel, so that I can use it for gumming saws? Information on this subject will be appreciated by—MANDRIL.

37. OAK.—If some of your gifted subscribers would give me the specific gravity and strength of domestic and imported oak, they would confer a favor on an old BACKWOODSMAN.

38. FLUTE.—How can I color the ivory joint of a flute black, without injuring the tone of the instrument?—CLEFF.

39. CUPBOARD.—I am well pleased with the design of bookcase and writing-desk shown on Plate 37, in the May number of the WOODWORKER, and would like very much if the designer, Mr. George Woodcock, would furnish you for publication, a design for a kitchen cupboard for a large farm-house where there are nine persons in the family.—AMATEUR.

40. BOOKS.—I am now an apprentice to a builder, and will end my service as such on the last day of the present year; I have received a fair common school education and am pretty well advanced in figures and geometry, I am no draftsman, but wish to become one, and also have a desire to acquire a passable knowledge of constructive architecture. I have about sixty dollars at my command, and wish to invest it in books such as will be of the most service to me. Now I will take it as a great favor, if some of your experienced readers will publish a list, in this department of your valuable paper, of such books as would suit a person in my position who desires to become a builder and contractor.—AMBITIOUS.

41. COMMUNION TABLE.—I have built a small Gothic church (Episcopal), in a country village, and wish to make a communion table for it, not too large or elaborate. Would some kind reader publish a design of a table, such as would be suitable for the church mentioned? I would like it to be in oak, with chamfers black.—CLERICUS.

42. NAILS.—I have somewhere seen an account where the adhesive force of nails and screws was given. Can you or any of your readers tell me where I can find the account, or give me a synopsis of the results of experiments made with nails and screws in different kinds of wood.—ANXIOUS.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

14. MACHINE CUTTERS.—B. G. can find the shape of his cutters, by proceeding as follows: Let A B C D, Fig. 7, Plate 43, represent the cutter head, F its centre; from F through A draw F A J, indefinitely. Make

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A E the distance the cutter is to extend beyond the face of the cutter head at its shortest cutting edge, and with F E as radius describe the arc E J H at random. Draw I K square from J F, and place section of moulding touching I K and F J, as shown. From the lowest cutting point J, draw J M touching arc described; from F square down J G from J M. Divide sections of moulding in any number of parts as shown by dotted lines. Upon J L and J F with F as a centre describe the various arcs as shown at F 1, F 2, etc., intersecting J M. The remaining lines are easily understood.—CUTTER HEAD.

23. SCALE.—"Steel Square" will find those mysterious figures and scale on the blades of first-class steel squares very useful for working octagons. It is applied as follows:

Take as many of the subdivisions as your stick is inches square, and lay off from a centre line each way and work to the lines given, and your stick will be octagon. Try it. This scale works from 1" to 74" on some squares. —JACK LEG.

21. EOLIAN HARP.—In answer to "Musical," I forward him the following regarding the construction of an "Eolian Harp." The sketches, Fig. 11, on Plate 43, will explain. 1. Top, two feet six inches long, five inches wide, half inch thick. 2. Bottom, the same length, etc., as top, with two bits of wood *a a*, two inches by five inches long, quarter inch thick at each end; *b b* two bridges for the strings to rest on. The strings must not be tightened too much, but be regulated so as to be moved by the wind; *c c* four screws to hold the box firm. The strings must be in the centre of the opening *o*. My brother reader must obtain four catgut strings, two of the smallest size, to put in the front side—that is, the side which the wind first acts on—and the other two at the back. The four strings are fastened to the four holes at each end, as seen in Fig. 2, and the top must be plain, with two holes at each end to screw to the bottom. When he wishes to hear it play, he must fix it under the bottom sash of the harp chamber window, taking care to put two pegs in the top to keep it from falling. I had one made on the above plan, which played for six or seven years, but since it is likely to be interesting, I will send for a future number an improved plan which I have now under consideration.—VIBRATION.

31. TEAKWOOD.—I submit the following for the information of Backwoodsman: Teakwood is a native of the mountainous parts of the Malabar coast of Java, Ceylon, etc. It grows quickly, straight, and lofty. The wood is light and porous, and easily worked; but it is nevertheless strong and durable. It is soon seasoned, and being oily does not injure iron, and shrinks but little in width. Its color is light-brown, and it is esteemed a most valuable timber in India for ship-building and house-carpentry. It has many localities.

In twenty-five years the teak tree attains the size of two feet in diameter, and it is considered serviceable timber, but it requires one hundred years to arrive at maturity. Its specific gravity varies from .585 to 1.056. Court states it at .657, and the weight of a cubic foot at 41.06 lbs.; and Barlow gives 15,000 lbs. as its tenacity per square inch. In thirty-six specimens shown in one of the late international exhibitions, the specific gravity was: maximum, 1.056; average, .711; minimum, .583.—LUMBERMAN.

Trade Mention.

TOLEDO, Ohio, reports a splendid retail trade.

THE Erie Chair Factory, Erie, Pa., is two months behind its orders on baby chairs and carriages.

C. P. GROVES, retail furniture, is erecting a new store on Lancaster avenue, Philadelphia.

DURING the past month Streit & Schmidt, Cincinnati, shipped 400 patent rockers and bed-lounges.

SOME of the Fourteenth Street, New York, dealers are securing back entrances to their stores from which all shipping is done.

BENT wood furniture is finding a good market from the South American trade. These goods meet with much favor in the locality mentioned.

HOOPER BROTHERS, at Biddeford, Me., are doing a large business in the manufacture of refrigerators, secretaries, desks, tables, wash-boards, etc.

Two car loads of the "Victor National" wash-boards were shipped to one house in Pittsburg, last month, from the shops of L. M. Crosby, Ashtabula, Ohio.

GEIER & KROEGER, Cincinnati, are making large shipments of brackets and fancy cabinet ware to the California market. Their new designs are meeting with wide favor.

JOHN DEPINAL, of Cincinnati, reports a larger trade in veneers than he has known in a long time before. His full force of workmen, including the book-keeper and himself, are officiating as packers.

THE committee having in charge the annual picnic of the New England Furniture

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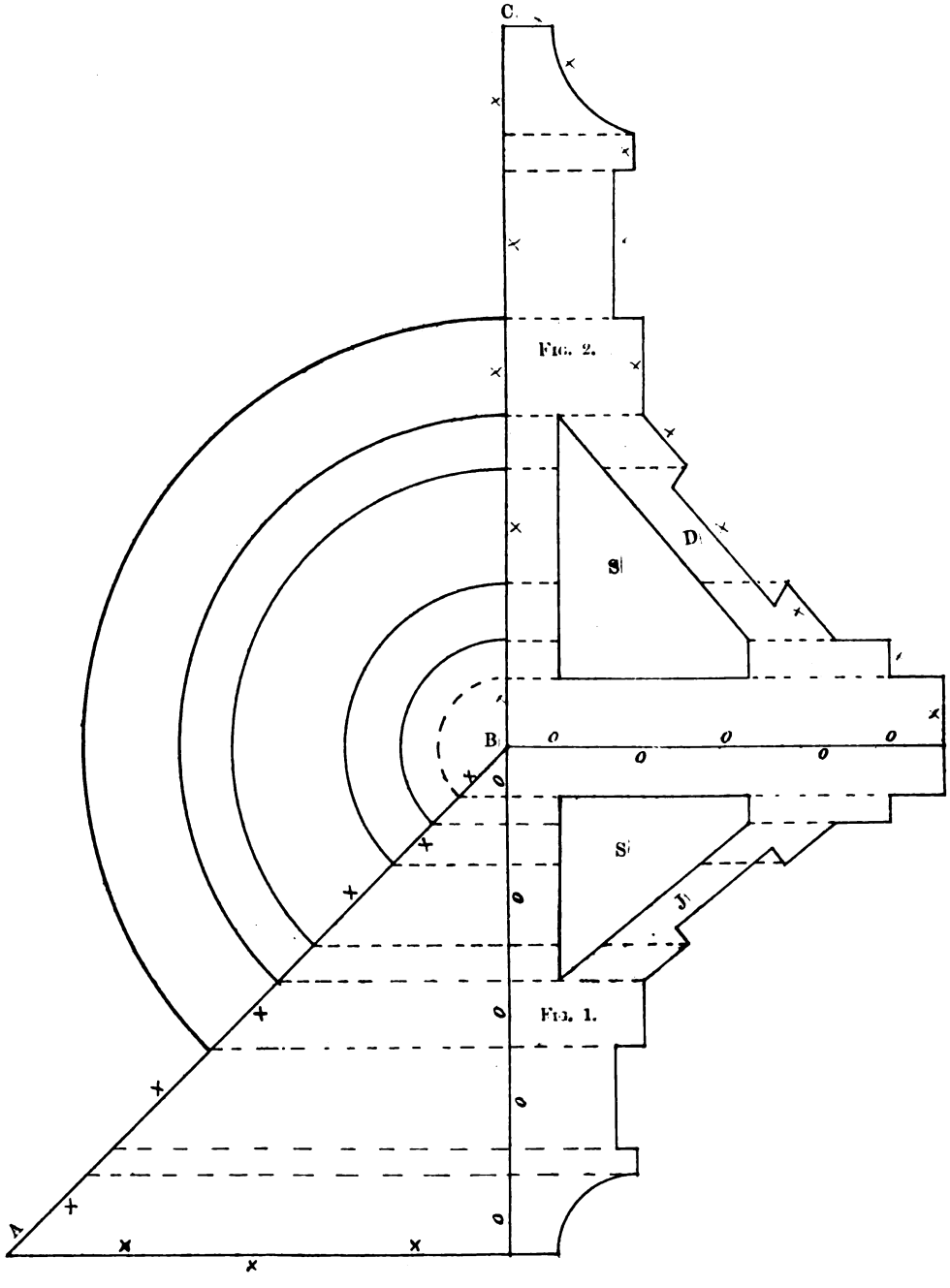
PLATE 46



PROJECTION BY ROBERT RIDDELL, ESQ.

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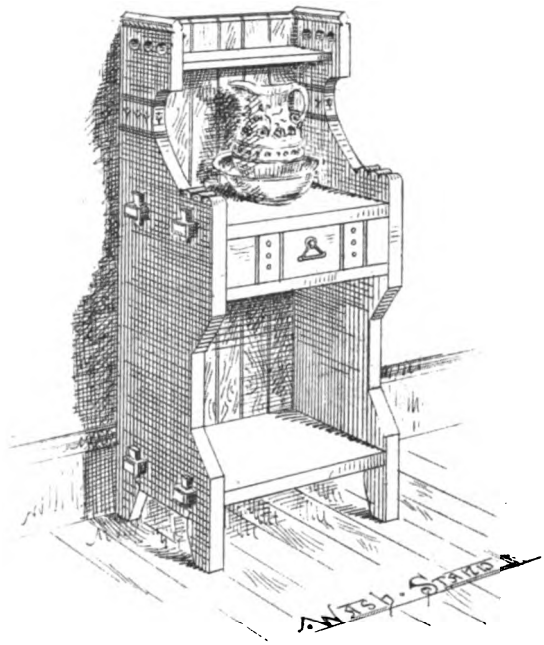
PLATE 47



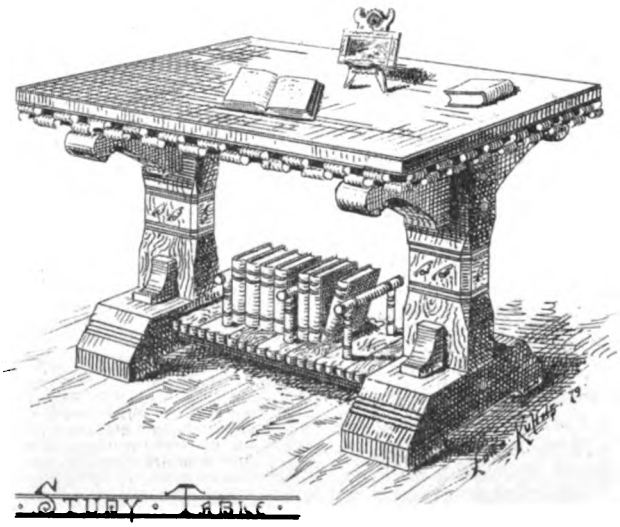


TABLE AND WASH-STAND.

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Exchange are still debating the attractions of several rival localities ; in this connection we have heard the names of Old Orchard Beach and Rocky Point.

BY the assignment of the Hart, Bliven & Mead Manufacturing Company, of 107 Chambers and 91 Reade Streets, 250 employees in Kensington, Ct., are thrown out. The concern was established in 1847, and had a capital of $300,000. The liabilities amount to over $200,000. The assets are valued at $300,000.

THE Woodruff Parlor Coach Co., running over the Manhattan Beach Railroad to Coney Island, has just added to their rolling stock about thirty new cars. Five of the finest are being furnished by Messrs. Gardner & Co., of New York, with their patent perforated veneer seats. The chairs are Queen Anne in pattern, and are of black walnut frame with gilt engraving. The monogram of the railroad company for whose use they are intended is painted conspicuously at the back of the seat, and directly beneath a finishing touch is given by a band of delicately painted ornamentation. The cars will be greatly beautified by the addition of these seats.

Pictures.

OFTEN in the pictorial papers are pictures of statuary which are nice for statue-picture work. Cut carefully away all the paper close to the picture, which paste upon black velvet. Put it in a deep frame with an oval or arched mat next the glass, and you will have a picture which cannot fail to please you. If you have a talent for pencil drawing, a head, or bouquet, or wreath of flowers drawn on thin card-board, cut out, put on black cloth or velvet, makes a fine picture, which, when framed, will well repay your labor. Pictures may be transferred to painted surfaces in the following manner : Cover the ground with an even coat of light-colored carriage varnish, which should be allowed to set (nearly as dry as if for gilding). If the print to be transferred be colored, soak it in salt and water ; if not colored, use water alone. Remove superfluous water by pressing between blotting pads, and then place the picture face down upon the varnish, pressing it smooth. When the varnish is dry, dampen the paper, and rub it off with the finger. The picture will be found upon the varnish, and another coat of the latter should be added to bring out the effect. This process answers equally well for glass or metal surfaces.

VARNISH FOR PAINTINGS.—"Amateur" is informed that a good varnish can be made as follows : Mastic, six ounces ; pure turpentine, one half ounce ; camphor, two drachms ; spirits of turpentine, nineteen ounces ; add first the camphor to the turpentine. The mixture is made in a water-bath, and when the solution is effected, add the mastic and the spirits of turpentine near the end of the operation, then filter through a cotton cloth. The varnish should be laid on very carefully.

Kindly Mentioned.

THE ILLUSTRATED WOOD-WORKER is one of the most attractive as well as one of the youngest of the useful journals devoted to the mechanical arts. It is designed to furnish practical instruction and helpful diagrams for the use of wood-workers, and certainly seems well calculated to render valuable service in the special field to which it relates. It is handsomely printed, and illustrated with some admirable designs of household furniture and diagrams of mathematical figures. The magazine is published monthly by Charles D. Lakey, 176 Broadway.—*New York Christian Intelligencer.*

. . . THE ILLUSTRATED WOOD-WORKER is the name of another new periodical whose object is to give instruction and information to carpenters, builders, cabinet-makers and other workers in wood, and this it does in a way that cannot fail to be useful and effective. Illustrations are given of furniture and dwellings which commend it to the favor of others besides those for whom it is the more especially designed.—*Dubuque Daily Telegraph.*

. . . THE ILLUSTRATED WOOD-WORKER.—The April number shows a writing-desk and bookcase of rich design, a sideboard, perspective view of a hall, etc. Such publications are valuable for the suggestions and new ideas they convey to the mechanic. . . . These illustrations are supplemented by descriptions and suggestions that give them the greater value.—*Vermont Standard.*

THE ILLUSTRATED WOOD-WORKER for April is even better than the previous numbers. It is neatly printed on tinted paper, and contains a design for an elegant combined writing-desk and bookcase in the Queen Anne style ; design for a sideboard, by F. W. Fieder ; a perspective view of a staircase and hall finished in oak, and a pretty design for a bookcase. . . . The reading matter is pertinent and interesting to the house-joiner, the car-joiner, the cabinet-maker, and to mechanics generally.—*Owego Gazette.*

. . . REPLETE with plans and information of value to all carpenters, house-builders, cabinet-makers, and others who either design or work in wood.—*New York Evening Telegram.*

THE ILLUSTRATED WOOD-WORKER is the title of a monthly publication described by its title. The April number contains some handsome furniture designs.—*New York Herald.*

. . . THE May number of this interesting publication contains designs for a wall cabinet, a sideboard, an amateur's design for a bookcase and writing-desk, a design for a fireplace, and four pages of useful designs for wood-workers, eight pages of illustrations in all. This is an admirable little publication and meets a want of all workers in wood. It has gained a large circulation since it was started in January, and well deserves the success it has achieved. Those interested would do well to enclose ten cents to the publisher for specimen copy, or ask a news-dealer to procure it.—*Pittsburg Christian Advocate.*

THE WOOD-WORKER is another addition, and a pleasing one, to the class of special journals. It is neat in appearance, carefully edited, its cuts are clear and well defined, and the selection of reading matter shows a clear comprehension of the wants and interests of the wood-workers.—*New York Mail.*

THE ILLUSTRATED WOOD-WORKER is the title of an interesting and neatly-printed little paper that has just made its appearance, and which, as its title indicates, concerns itself with the interests of workers in wood, a large and important class and one that is just now particularly active in some of its leading branches. It is to be published monthly, at one dollar a year. The illustrations are good, and the different articles are simple, technical, and practical.—*New York Sun.*

. . . IT is an excellent journal, containing valuable matter in the interest of wood-workers, and will fill a long-felt want in this line. It is essentially a workman's paper, and published at the popular price of $1 per year.—*The American Inventor.*

. . . THE ILLUSTRATED WOOD-WORKER, a journal intended for the "three hundred thousand workers in wood" who confess the want of a cheap illustrated periodical such as the object is to make this. It will be sent to subscribers of the *Builder* free for the first year, and to others at one dollar. The initial number shows designs for doors, a staircase, bookcase, and writing-table, and drawings in practical carpentery which must

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recommend it to those for whom it is intended.—*Berwick Independent.*

. . . This is a sixteen-page octavo, with eight pages of illustrations, handsomely printed on good paper. The designs are suited to the wants of cabinet-makers, joiners, stair-builders, and amateur workers in wood; and they evidence much originality and good taste. The wonder is, indeed, how so much that is fresh in the art of wood-working can be afforded for so small a price. Nothing of the kind has ever been attempted before. The monthly issues sell for ten cents each, and are to be had everywhere of news-dealers.—*New York Christian Advocate.*

. . . It should be in the hands of every mechanic and artisan. Its information is varied and reliable.—*Lowville Watchman.*

. . . It is calculated to interest the readers for whom it is designed.—*Philadelphia Times.*

. . . The journal is issued monthly. While mentioning this paper, we may say that it is one of the most deserving and one of the most successful of the late ventures in special journalism. As its name implies, it is designed for such mechanical trades as have to do with wood-work of all kinds, cabinet-makers, carpenters, stair-builders, car-builders, etc. It is filled with illustrations and plans, with lucid explanations and practical suggestions. Most of the designs furnished are original, which fact adds much to their value. No wide-awake wood-worker can afford to do without the journal, and its low price brings it within easy reach of all. It is edited by Fred. T. Hodgson, and published by Charles T. Lakey.—*American Bookseller.*

. . . An excellent publication for all persons who work with edge-tools.—*Toronto (Ont.) Telegram.*

The Illustrated Wood-Worker is a new publication for joiners, cabinet-makers, carpenters, builders, etc. It gives numerous drawings, besides much excellent information, and is only $1 a year.—*Collingwood (Ont.) Bulletin.*

. . . This is an excellent publication for carpenters, joiners, and wood-workers generally, and cannot be too highly recommended.—*Collingwood Enterprise.*

. . . To the cabinet makers and carpenters that have asked us for articles on their work we would strongly recommend this paper. It only costs 10 cents per month, or $1 per year.—*Canadian Amateur.*

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Owing to the great demand for these drawings, our stock has been reduced to such an extent that we can only furnish them in lots of six sheets to each address, which we offer for the sum of twenty-five cents.

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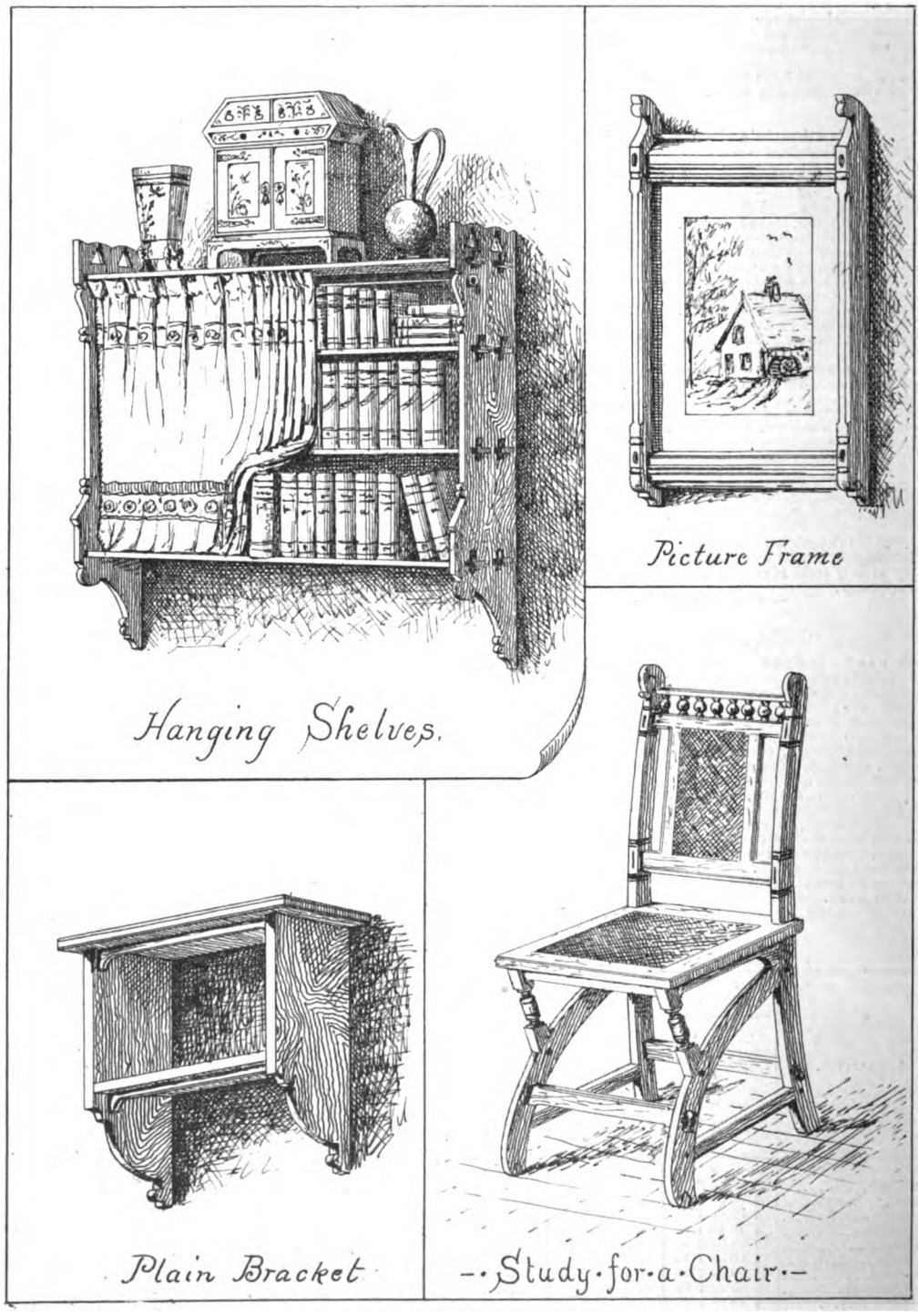
PLATE 48



STUDIES FOR AMATEURS.

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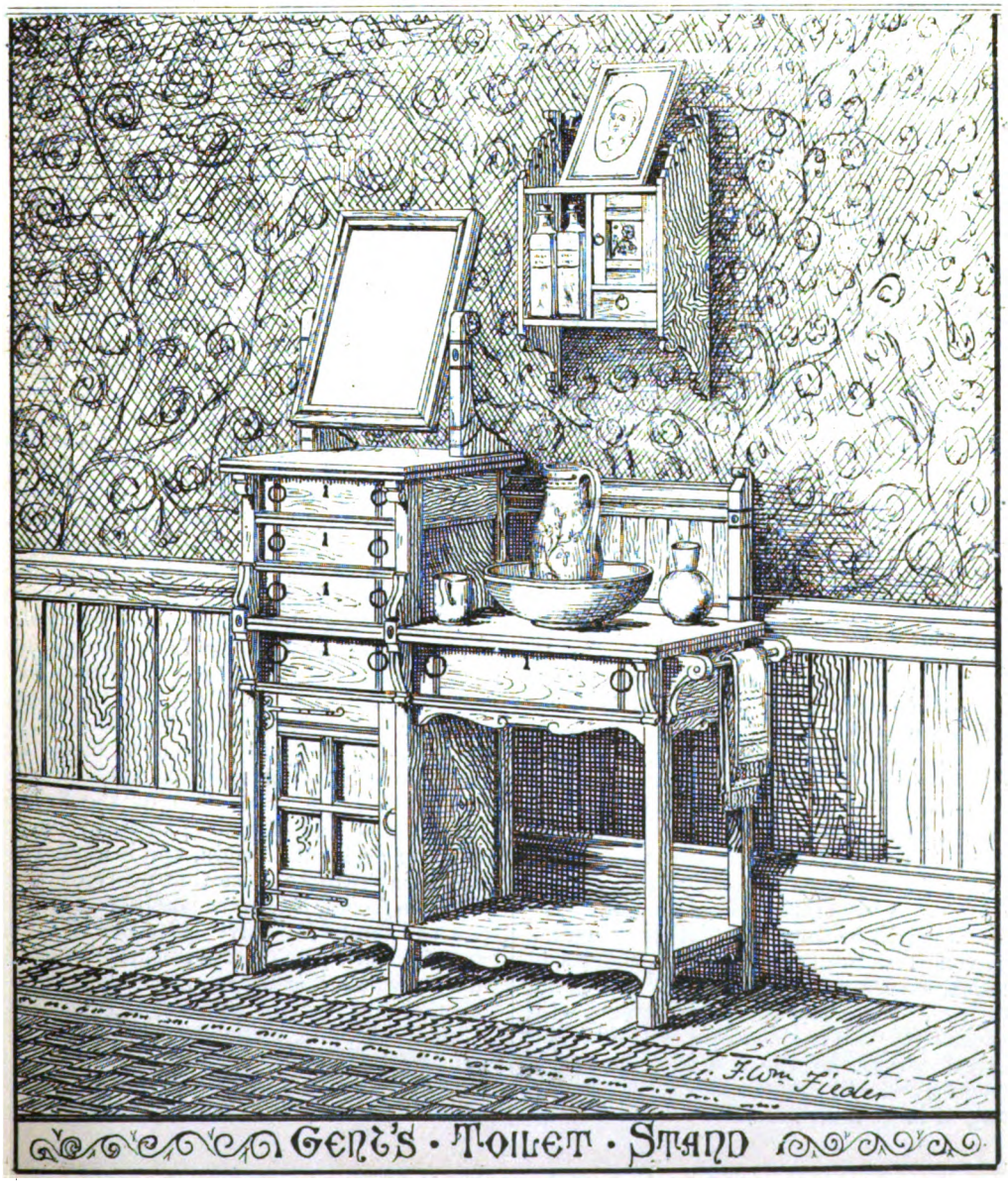
VOL. I No. 7. JULY, 1879. PRICE TEN CENTS.



GENT'S · TOILET · STAND

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Gent's Toilet, Hanging Cabinet; Hand-Railing; Problems; Hall and Staircase; Newel Post; Projection; Rustic Chairs; Toilet.

Our Illustrations.

WE are sure our readers will appreciate the illustrations we publish this month; in fact, we have no hesitation in saying that this number is superior to any of its predecessors in many ways.

On the title-page we show a very pretty design of a gent's toilet stand, with a small hanging medicine cabinet over it. The construction of both the cabinet and toilet stand is of the simplest kind, and is characteristic of the designer, Mr. Fieder, who seems to possess a happy talent for combining elegance and good taste with easy construction.

PLATE 50 shows two sections, illustrative of the papers on "Sectorian Hand-railing." Explanations will be found in another column.

PLATE 51 shows a number of problems in practical carpentry. Explanations are given elsewhere. These practical illustrations, with the accompanying explanations, will be found of great service to the operative joiner or carpenter, and will prepare him for the undertaking of large and difficult works in timber, such as bridges, roofs, domes, and tressle-works.

PLATE 52 shows a "hall and staircase." This drawing, which was prepared by Mr. C. H. Springer, of Providence, R. I., contains many things that are suggestive. It is to be regretted that Mr. Springer did not furnish us with a detailed description of the drawing, and the materials used in construction, as it would give the reader a clearer idea of the artistic merits of the design.

PLATE 53 shows, on a larger scale, the newel-post shown at the foot of the stairs in the previous plate. This design is also furnished us by Mr. Springer.

PLATE 54 is illustrative of another of those practical examples in projection by Robert Riddell that have been so well received by a large number of our readers.

PLATE 55.—This plate has been reproduced at the request of several subscribers, who are amateurs, and who wish to try their hands at rustic-chair making. The designs will, no doubt, be of service to many of our readers besides amateurs.

PLATE 56 is a design for a toilet by Mr. Kuhns. It needs no comment, as it tells its own tale, and tells it well.

WHEREVER there are accumulations of fine dust there is danger of an explosion, and it must be admitted that in wood-working factories, and particularly those converting dry material, it is rare indeed that dust is not to be found in abundance. Richards, in one of his works on wood-working establishments, says that the inflammable and explosive nature of wood-dust is not generally known, but few being aware that it is a fulminate like gunpowder. Any dust of combustible material, when floating or thickly distributed in the air, explodes or burns up with great force. To prove this, let any one hold a candle beneath a girder or beam in a wood shop and sweep off the fine dust from its top, so as to fall on the light, and he will be convinced of its explosive nature. It is true there have been few if any fires in wood-working factories traced directly to this cause, but it will not do to argue from this that none have occurred. A large proportion of the fires in planing-mills and similar places are of unknown or accidental origin, and it is far from unreasonable to suppose that many of them would be found, if it were possible to investigate the matter, to have been the result of explosions of this character. There are many ways in which the necessary combination of dust and air might be effected, and the fire to ignite it supplied, while the chances of discovering how it was done, after the mill is destroyed, are very small indeed.

Where sawdust and shavings are removed

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either by automatic devices or otherwise, as fast as they are made, and the mill and machinery kept perfectly clean, there is little danger that fine dust will accumulate in out-of-the-way corners, or anywhere, to furnish the means of kindling at some unlucky moment a fire which can never be accounted for. And this is the only way in which dust explosions can be guarded against. It is almost impossible to prevent the use of exposed lights in mills in some shape or other, and if dust is lying about where it ought not to be —and it surely ought not to be in any well-conducted cabinet-shop—it is almost certain to be some time or other stirred up under circumstances which are extremely favorable for its explosion.

It is not many years since the professional architect thought it beneath his dignity to design cabinet-work, or pay attention to decorative painting. Now, however, some of the best minds in the profession can be engaged in designing new furniture, and the departure has neither lowered the dignity of the profession nor the artistic character of the work. Indeed, we are inclined to think that houses of any pretension, built under the supervision or from the plans of an architect, should have all the furniture required for its complete equipment designed and executed under the eye of the same architect. We have sufficient faith in the abilities of our architects to believe that, if this system was adopted, our houses would be more consistently furnished, and the manufacturers would be benefited by getting orders for a more substantial and better class of work.

Parties desiring back numbers of the Wood-Worker can get them in single numbers by addressing this office and enclosing the price. Those wanting the first six numbers can have them, bound in limp covers, with a gold title on the cloth cover, by remitting sixty cents to the publisher.

"Hints on Estimating," a little pamphlet of thirty-two pages, has been published in this office. It is an excellent work for builders. We send it to any address in Canada or the United States for six cents.

Lessons in Projection.

By Robert Riddell, Teacher of the Artisan Class in the High School, Philadelphia, Pa.

One of the most difficult problems in carpentry to thoroughly understand is that of inclined framing. To find the shoulder and other cuts of each particular piece has long taxed the ingenuity of our best workmen, and many attempts to render the discovery of these lines less complicated have been made, but in most cases the results have not been satisfactory. Now, however, for the first time, I offer a perfectly reliable method for the finding of these lines, and one which may be easily tested and as easily understood if the following directions are closely followed:

Let us suppose the plan to be a right-angled figure, having sides which incline or flare equally to any desired angle. A corner post is also used which will incline same as ends and sides. The junction at the angles may either be formed by mitreing or by butt joints.

To describe the problem, begin by drawing two parallel lines, A B, and D C, Plate 54, any reasonable distance apart. Assume A N as inclination or flare of sides. From N square down a line making N A and N R equal. From A square down a line cutting D, join R D and in the angles thus formed find bevel 2 for cut in face of sides.

To find the bevel for mitre on edge of stuff, take N as a centre and describe an arc, touching the line A B and terminating at J. From R draw a line through J indefinitely. This gives bevel 3 for the mitre.

To find the corner post, proceed as follows: Make N C equal N D, join R C, and extend A N to cut R C at P, from which square up a line cutting at B. From N draw through B, thus forming both angles of the corner post, and giving bevel 4, which answers for either a butt joint, or the shoulder cuts on cross rails of framing.

Nothing can be more simple or more accurate than this method, and, as already mentioned, its correctness may be easily tested by first drawing the "spread-out," as shown on the upper portion of the Plate, on card-board, and cutting through on the lines marked x x x x; then fold on the lines marked o o o. Bring the points S and S together, and the mode of construction will readily be understood.

The flare may be any angle; the result will always be the same.

We shall next proceed to show the construction when the sides are to flare and make different angles. This problem is frequently required in carriage and other work.

Isometric Projection.

In Fig. 8, Plate 31 (April number), we give at *a* the plan of top, at *b* the side, and at *c* the end elevation of a box, all of which are comprised in one isometrical drawing, as in Fig. 3, the mode of construction of which we now explain. Draw a right-hand isometrical line *a b*, Fig. 3, making it equal to the line *e d* in Fig. 8; next draw the left-hand isometrical line *a c*, Fig. 3, equal to the line *f g* in

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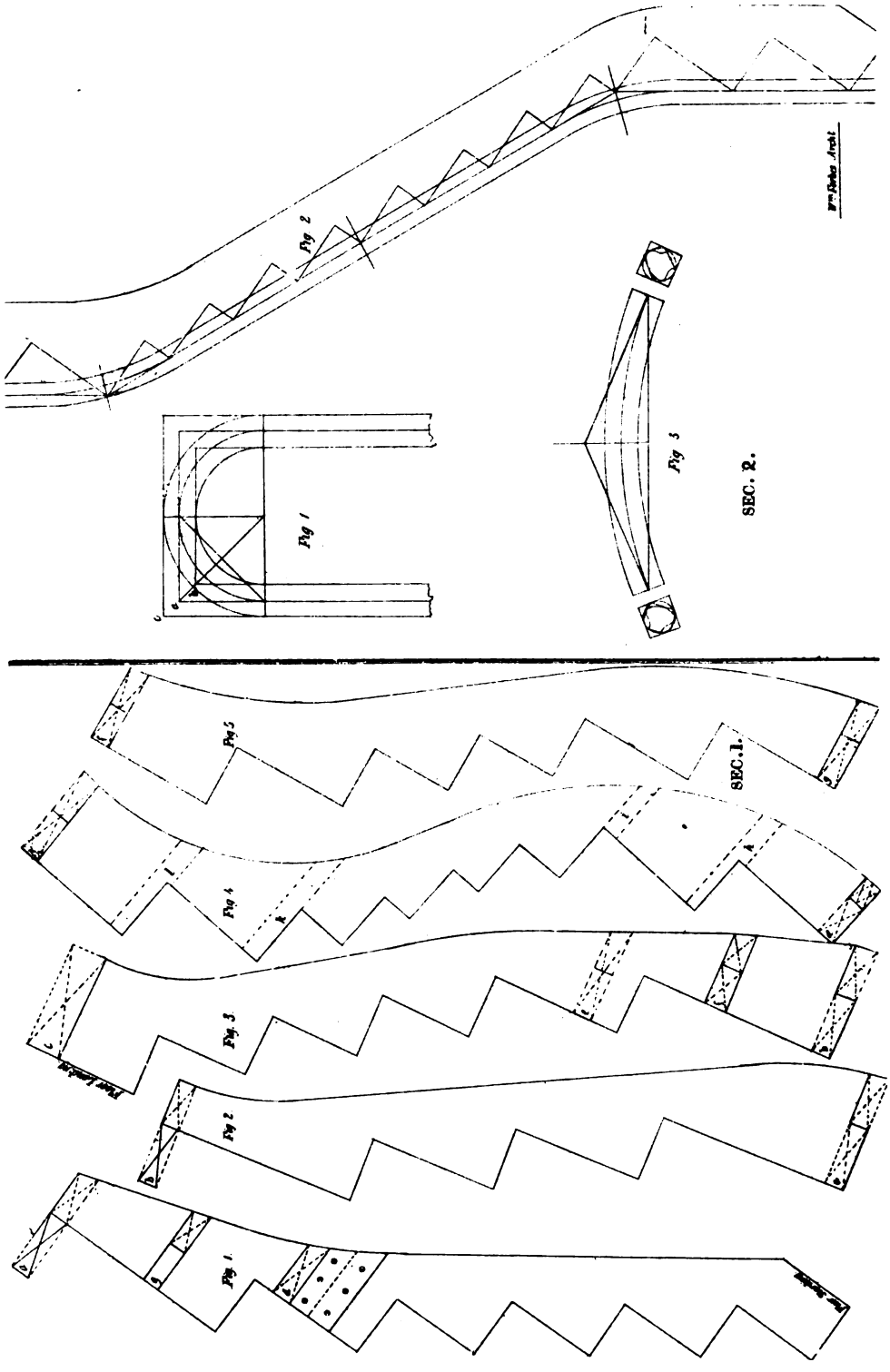
PLATE 50.



THE SECTORIAN SYSTEM OF HAND-RAILING.

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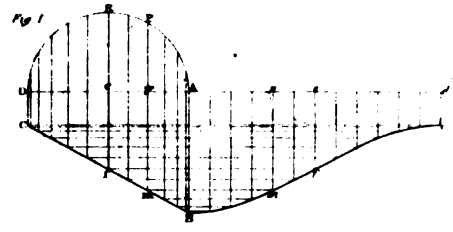
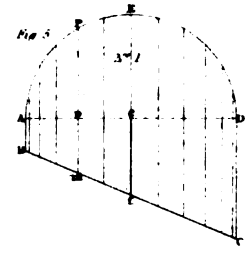
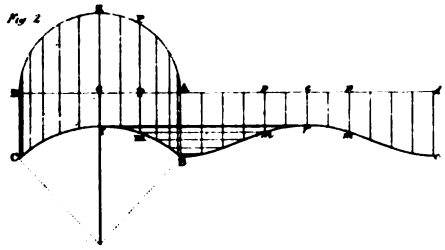
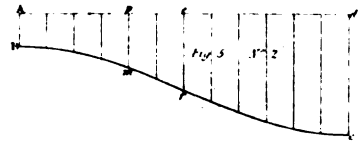
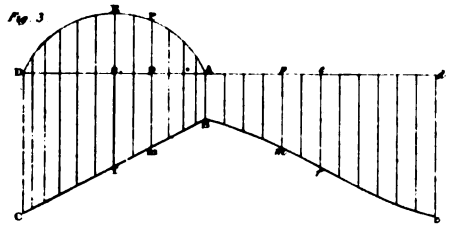
PLATE 51.

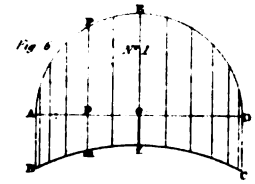


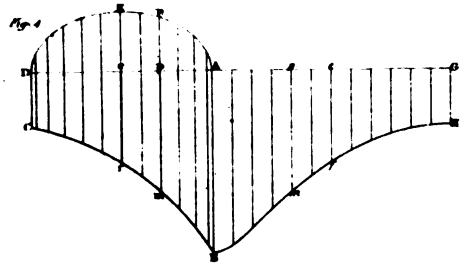


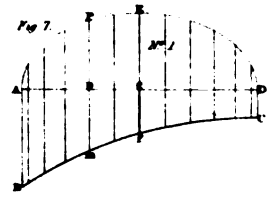


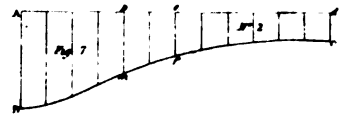












PRACTICAL CARPENTRY.

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Fig. 8. From the points *b c*, Fig. 3, draw isometrical lines, meeting in the point *d*; *a c d b* will be the isometrical projection of outline of top of box shown in plan *a*, Fig. 6. From *a c* and *b* draw perpendicular lines *c f*, *a e*, *b g*, and make them equal to the line *e d*, Fig. 8. From the point *e*, Fig. 3, draw isometrical lines to the points *f* and *g*. The rectangle *c f e a*, Fig. 3, is the isometrical projection of the outline of side of the box *b* in Fig. 8; and the rectangle *a e g b*, Fig. 3, of the end *c*, Fig. 8. The thickness of the sides is shown by taking from the plan *a*, Fig 8, the thickness, and setting it off from the points *b a c*, and *d*, to *k k i* and *h*; and from these points drawing isometrical lines, which, intersecting, form an inner rectangle, as shown in Fig. 3. The method of filling in the notches on the sides, Fig. 9, which, for convenience, is shown to a scale twice the size of that in Fig. 3. To put in the notches at the sides of the box in Fig. 3, draw, as in Fig. 9, two lines, *a c*, *b d*, representing the edge of the box. From *a*, Fig. 8, take the distance *d i*, and set it off from the point *a*, Fig. 9, to the point *e*; set off the distance *j i*, Fig. 8, from *e* to *f*, Fig. 9. From *e* and *f*, Fig. 9, draw isometrical lines to *h* and *g*. From *h*, *e*, and *f*, draw perpendicular lines, equal to the distance *k l*, in *h*, Fig. 8, *h i*, *e j*, and *f k*.

Proceeding to other examples, we give in Fig. 10, at *a*, the plan, *b* the section of a cut-stone, and at *c* an isometrical view of it. In drawing this proceed as in Fig. 11, which, for convenience, is shown of double the size. Draw two isometrical lines *a b*, *a c*, Fig. 11, and make *a b*, *a c*, equal to *d e*, *d f*, Fig. 10; draw the perpendiculars, *c f*, *a d*, Fig. 11, and make them equal to the depth of end *g*, Fig. 10. Join *d f*, *d e*, and from *f* and *e* draw lines cutting at *g*. From *f*, Fig. 10, measure to *h*, and set off this distance from *g* to *h*, Fig. 11, draw *h i*, and finish as shown.

Practical Carpentry.

COVERING OF SOLIDS.

On Plate 55 we show how the development of surfaces is generated by a straight line moving parallel to itself. An inspection of the figures will be sufficient to explain the process. These figures contain some of the forms of development that occur in practice, as applicable to the sofits of arches in doors, windows, reverses, and passages. In all these diagrams, the point E is in the middle of the arc which forms the end of the arch. A *e* on the straight line is the developement, if A E, *e d* is equal to *e* D, and *e p* is equal to E P, *e f* is equal to *e* F. Where there is not sufficient room for the plan and sections of the solid and development of its surface in one diagram, Figs. 5, 6, and 7 show how they may be separated.

Next month we will give practical illustrations on the covering of solids in sufficient number to cover any exigency that may ever occur in the practice of any ordinary builder, and after that we will enter into the discussion of matters that the workman meets with in his every-day occupation.

The Sectorian System of Hand-Railing.

SEVENTH PAPER.

Plate 50.

On this plate are shown the horse-pieces of stair, Plate 42, Sec. 2.

Fig. 1 is the first piece, and runs up to the first angle at A.

Fig. 2 commences at A, and extends to the next angle at B.

Fig. 3 commences at B, and extends to the floor landing at C.

Fig. 4 is the first cross-piece in rear of cylinder.

Fig. 5 is the second cross-piece, and constitutes all the full-length pieces. All the others, as marked on Plate 42, from one to eight, are *fillers*, and should be well filled, as the lower and upper pieces depend, in part, on them for support. All the bevels for cutting the riser lines can be obtained on plan—Plate 42, Sec. 2.

Section 2 is a continuation of Plate 42 and Section 1 of 50, Fig. 1, showing the plan, Plate 42, with tangents drawn as at a, b and c: a, being the centre line, has all to do with the sector.

Fig. 2 is the stretch-out of winders in the wreath, with two lower flyers, and one above the cylinder. The rail shows the easements, which must be obtained in the usual way, with the falling moulds. It will be seen that the falling moulds are straight with the exception of a slight curve at the end. After the convex and concave slabs are removed from the wreath-pieces, thus giving the outer and inner twist, the application of the falling mould, as laid down, will find plenty of wood for its use in giving shape to the rail. Of course it is understood that kerfing is the mode for the top and bottom twist.

Fig 3 is the quadrant wreath-piece for Fig. 1, the end sections showing the direction given to spring and plumb bevels. The same mould will answer for both pieces by reversing the same.

It will be seen by the plates presented, that all lines calculated to confuse have been dispensed with; while everything, it is thought, has been introduced to make the work plain to the comprehension of any one of ordinary capacity.

Send six cents for "Hints on Estimating."

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Correspondence.

We invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of the Wood-Worker:

I am an amateur, and am trying to make a book-case and writing-desk combined, similar to the one designed by Mr. Woodcock, and shown in the Wood-Worker for May, Plate 37. My object in writing you is information; there are some things about Mr. Woodcock's design that I cannot understand; will that gentleman explain? On the drawing at the left hand of the page the case is shown finished, and there is an ornamental cornice or cresting; on the right hand figure, where the inside arrangement is shown, there is no ornamental work to be seen. What is intended by this arrangement? How are the figures shown in the doors and drawers executed? Are they surface figures, raised, or sunk? If sunk, how are they finished, in gold, black, or red? What was the probable cost of the materials used, including hardware, lumber, and machine work?

If Mr. W., or any other gentleman that is posted, will answer these questions, or give any further information or suggestions regarding the style of work or arrangement of desks of this kind, it will be duly appreciated by

David A. Hall.

Jersey City, June 14th, 1879.

Editor of the Wood-Worker:

I have received the six "Detail Sheets" I sent for, and I can assure you that I am well pleased with them. I am only sorry that I did not send when you offered the twenty-seven sheets for sale, as I know now that I have missed something valuable by not having the whole set.

The Wood-Worker is getting better and better every issue, indeed it is getting to be a journal of art, and will be the means of inducing a large number of educated people to study, imitate, and originate choice examples of furniture, and also be the means of giving enjoyment to hundreds of young persons who love to handle edge tools. Wishing the Wood-Worker every success, I am

John Randolph.

Detroit, Mich., June 17th, 1879.

[We have chosen the above letter from among a large number on the same subject, in which nearly every writer regrets that he did not secure a full set of the "Detail Drawings" before they were sold out. To these parties we would state that the publisher of the Wood-Worker, Mr. Chas. D. Lakey, has prepared a number of packages of cheap drawings (see advertisement on page 110 of present issue), which contain an infinite number of good and useful designs, together with a large amount of reading matter and useful recipes, etc., etc., and which are sold at an exceedingly low price.—Ed.]

Intercommunication.

This department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the number and title of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

43. Wreath.—Will any of your readers, versed in Lucius D. Gould's system as described in his "American Stair-Builders' Guide," inform me whether they have executed a wreath successfully by following the description given on Plate 10 of that work, or whether they think it possible?—W. H. C.

44. Saw.—Will some brother reader inform me how I can take the "buckle" out of an ordinary hand-saw?—A. P. G.

45. Planes.—I should be pleased if some of your subscribers would answer the following questions: (1) Whose make of "Rounds and Hollows" is best, and most in use? (2) Are the Bailey iron bench planes the best; if not, whose are? (3) Is the mitre-box, manufactured by Stanley, reliable and easy to handle? Replies to these "Queries," with any remarks the writer may see fit to make, will be duly appreciated by—A. P. G.

46. Trades.—I should like to know what makes the difference between a carpenter and a joiner as tradesmen, if you or some of your readers would kindly furnish the information through the columns of the Wood-Worker?

The desired information will be of service to a large number of readers as well as—Wood-Butcher.

47. Mahogany.—What native wood resembles mahogany the most, and how is it stained and prepared for polishing or varnishing? Any information on this subject will confer a favor on a—Country Cabinet-Maker.

48. Varnishing.—I wish some of your readers would give a few hints, in your journal,

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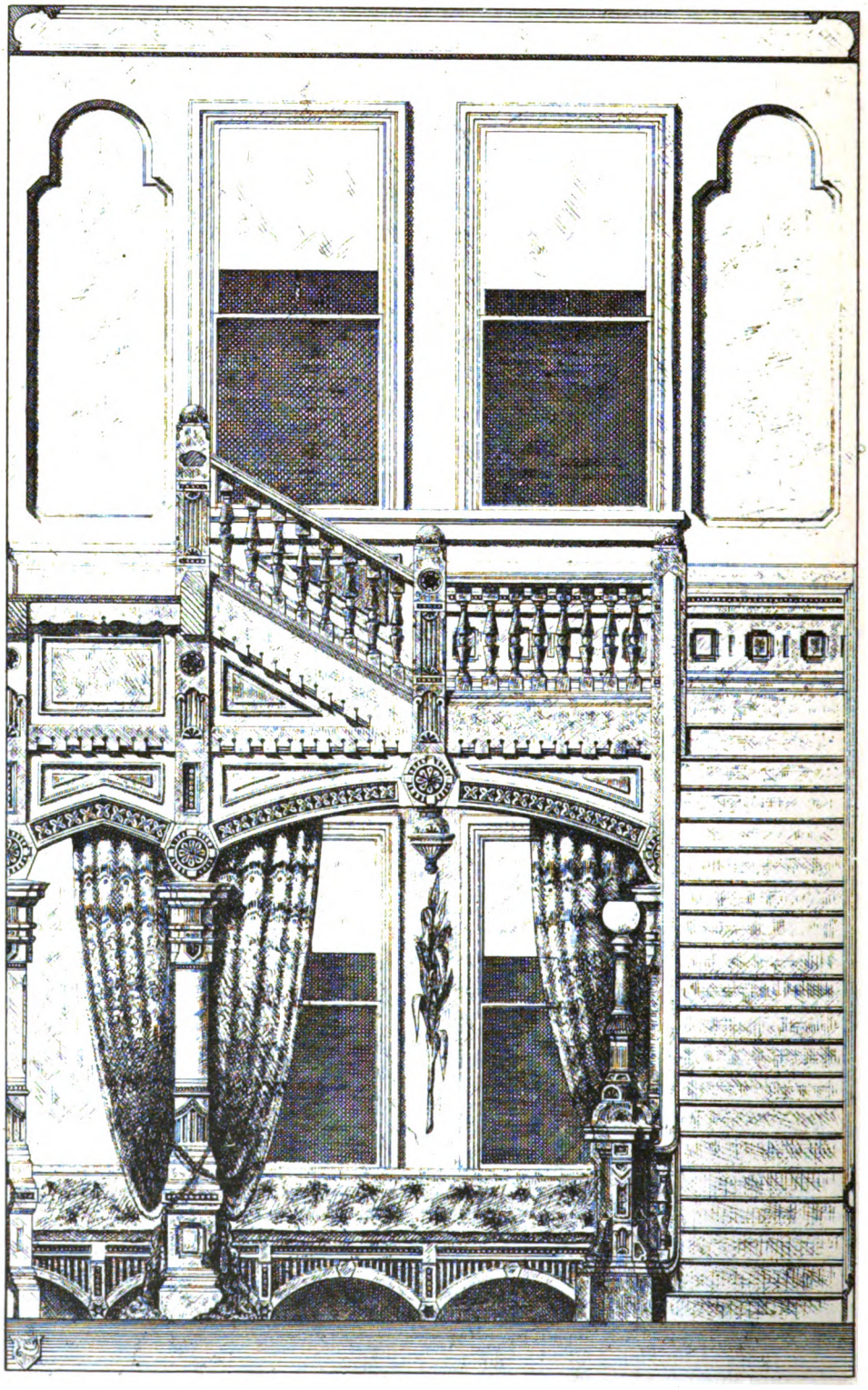
PLATE 52.



HALL AND STAIRCASE.

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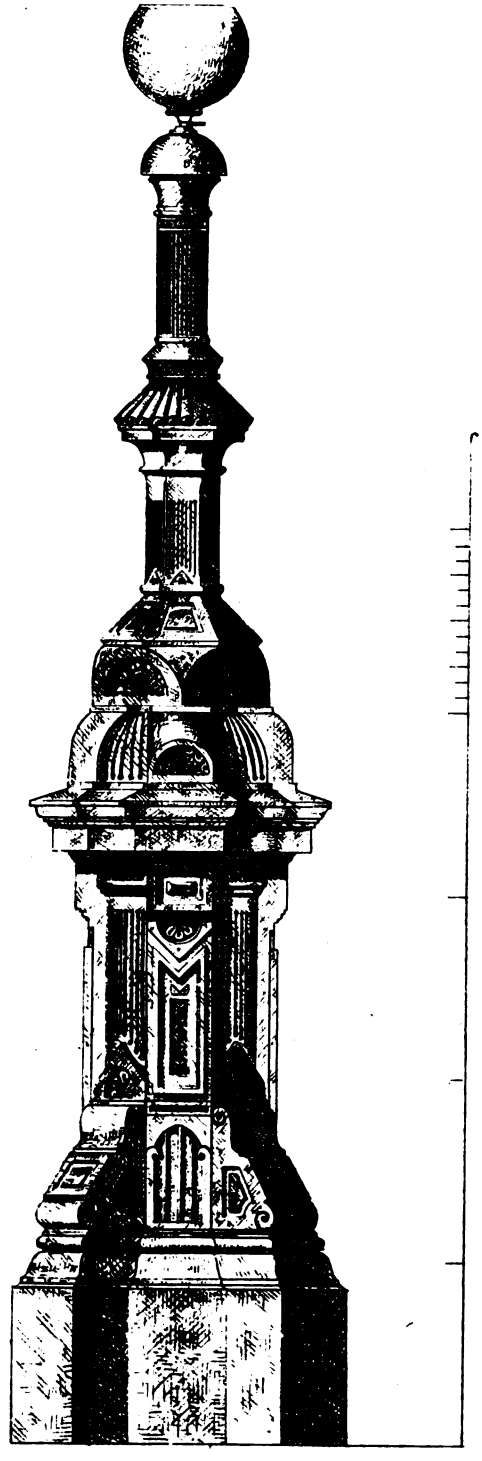
PLATE 53.



DESIGN FOR NEWEL POST.

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to a young apprentice, regarding varnishing and polishing. I take the WOOD-WORKER regularly, and am well pleased with it.—APPRENTICE.

49. TOOLS.—If some kind reader will give a few directions in the choice of tools used in the cabinet trade, I for one will be obliged.—TABLE.

50. PEWS. — When did pews come into general use in churches? I have always understood that the early Christians would not tolerate any sitting accommodation in their places of worship; consequently, pews, or other sitting accommodation, must have been an innovation of later date than the fifth century. Any information on this subject will oblige—ARCHITECTUS.

51.—EBONIZING.—Can any of your readers tell an amateur how to ebonize pine, oak, ash, cherry, etc., satisfactorily? Our furniture factories keep their process a profound secret. I have tried the recipes given in the January number and am not satisfied with them. Also the best way to finish up work after it is blackened?—EBENEZER.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

36. SAWS.—Mandril can make a wheel that will answer his purpose, by coating it with good glue and rolling it in emery, heated to about 200° Fah. Emery-wheels made this way are not of much service; better get a solid emery-wheel, as it will be much cheaper in the end, and will certainly give better satisfaction.—GUMMER.

37. OAK.—Perhaps the following, which is taken from an authority, may give "Backwoodsman" the information he desires: "There are two kinds of this timber common in England, on the Continent, and in America. Oak of good quality is more durable than any other wood which attains the same size: its color is a well-known brown. Oak is a most valuable wood for ship-building, carpentry, frames, and works requiring great strength or exposed to the weather. It is also much used for carved ornaments, panelling of rooms, pulpits, stalls, and standards for churches. It is likewise used in the construction of all kinds of buildings, for strength and stability. English oak is one of the hardest of the species: it is considerably harder than the American, called white and red Canada oak. African oak is well adapted to the construction of merchant vessels.

"The specific gravity of good English oak, 0·83; weight of a cubic foot, 52 lbs.; weight of a bar one foot long and one inch square, 0·36 lb.; will bear upon a square inch without permanent alteration, 3960 lbs., and an extension in length of $\frac{1}{430}$; weight of modulus of elasticity for a base of one inch square, 1,700,000 lbs.: height of modulus of elasticity, 4,730,000 feet; modulus of resilience, 9·2; specific resilience, 11.

"Compared with cast iron as unity, its strength is 0·25; its extensibility, 2·8: and its stiffness, 0·093."—QUERCUS.

38. FLUTE.—The following has been recommended for staining ivory black, and may answer "Cleff's" purpose: "Suspend in a strong aqueous solution of neutral silver nitrate exposed to direct sunlight until black; then wash thoroughly with water."—LILY.

40. BOOKS.—"Ambitious" should get all the back numbers of the AMERICAN BUILDER, which will cost him probably $40; Riddell's works, $15, and "Rosengarten's Architectural Styles," $3; and he will have all he can get along with, and if he is "sharp," he will find in those books all the *really* useful information he will ever require.—BLUNT.

40. BOOKS.—In my youth I was similarly situated as "Ambitious;" I applied for advice to an old contractor, who had done business in one of the chief cities in New England for forty years. "Young man," said he, "if you want to get book knowledge on building and architecture, get 'Peter Nicholson's Encyclopædia of Architecture,' 'Peter Nicholson's Art of Carpentry,' and 'Peter Nicholson's Guide for Mechanics.'" I purchased the works named, and, for those days, I found they answered all my purposes; of course, I have since added to my library books more suitable to this country and this age, but I never forget my first love. I do not say that "Ambitious" should obtain "Nicholson's" works, for they are superseded, but he should obtain works of a like character, such as "Gwilt's Encyclopædia," cost $20; "Newland's Carpenter and Joiner's Assistant," "Robert Scott Burns' Works," and last, but not least, the whole numbers of the AMERICAN BUILDER since its first issue.—CONTRACTOR.

NOTE.—We have received several other answers to "Ambitious's" "Query," but are obliged to withhold them for want of space. We have chosen for publication the answers we considered the best, but in our opinion they are both faulty—very much so—and we take this opportunity to name the books we

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think would be of most use to a young man placed in the same position as "Ambitious" is. First, an encyclopædia is indispensable, and we name

"Gwilt's," as being the best, price	$20 00
"Warren's Drafting Operations."	1 25
" Freehand Drawing."	1 00
"Riddell's Lessons in Hand-railing."	5 00
" New Elements of Hand-railing."	10 00
" Artisan."	5 00
"Lakey's Village and Country Houses."	5 00
"Rosengarten's Architectural Styles."	3 00
"Progressive American Architecture."	6 00
"Vogdes' Prise Book."	1 50
"Scribner's Mechanic's Companion."	1 50
"Ames' Alphabets."	1 50
Total	$60 75

Of course, this does not include the AMERICAN BUILDER, as that journal is supposed to be taken regularly by every wide-awake carpenter and builder in the land. The books enumerated above cover the ground "Ambitious" seeks to travel very fairly, though forty dollars more, as judiciously expended, would procure him a library sufficient for all his requirements, provided he subscribes for all the building journals issued in the country. —EDITOR.

42. NAILS.—"Anxious" can find the desired information in "Tredgold's Carpentry," by Hurst.

The following experiments were made by Mr. Bevan. He says, the progressive depths of sixpenny nail into dry Christiana deal by simple pressure across the grain was as follows:

¼ of an inch	24 lbs.
½ of an inch	76 "
1 inch	235 "
1½ inch	400 "
2 inches	610 "

To extract a sixpenny nail from a depth of one inch (1′) out of dry oak required a force of 570 lbs.; dry elm, 327 lbs.; dry beech, 667 lbs., and green sycamore, 312 lbs. Owing to the taper in nails the resistance to entrance becomes of necessity greater than that of extraction, the ratio was found to be about six to five. The same nail driven edgeways into dry elm one inch required a force of 257 lbs. to extract it, and driven endways into dry Christiana deal one inch required a force of 87 lbs. to extract it. The relative adhesion therefore in the same wood when driven across, or with the grain of the wood, is about four to three for dry elm and about two to one for deal.

It was found by Mr. Bevan that the force required to cause sliding or complete separation in the plane of the joint of the two pieces of Christiana deal, each seven eighths of an inch thick, when nailed together with two sixpenny nails, was 712 lbs.; the same for dry oak one inch thick, 1009 lbs.; the same for dry sound ash, 1420 lbs.

The same author has given us valuable information on the adhesion of screws. With a screw two inches in length, $\frac{22}{100}$ of an inch in diameter at the exterior of the threads $\frac{16}{100}$ of an inch in diameter at the bottom, the depth of the thread being $\frac{35}{1000}$ of an inch, and the number of threads = 12. The screws were passed through pieces of wood exactly one half inch in thickness, and were drawn out by the weights specified in the following table:

Dry Beech	790 lbs.	Dry Mahogany	770 lbs.
Dry Sound Ash	790 "	Dry Elm	655 "
Dry Oak	760 "	Dry Sycamore	830 "

The weights were supported about two minutes before the screws were extracted, the force required to draw similar screws out of softer woods is estimated at about one half the above.

A common screw of one-fifth of an inch in diameter was found to have an adhesion of about three times that of a sixpenny nail.—ENQUIRER.

We solicit early answers from our subscribers to the following "Queries," made in previous issues, and which, so far, have not been answered:

No. 15.—CORNER CUPBOARD.
" 15.—EMBLEMS.
" 16.—SECRETARY.
" 17.—CROCKETT'S PRESERVATIVE.
" 20.—RAILING.
" 30.—STAIR CYLINDER.
" 33.—HOWE TRUSSES.
" 34.—COTTAGE.
" 35.—PLOUGH.
" 39.—CUPBOARD.
" 41.—COMMUNION TABLE.

Clamping Picture-Frames.

AN excellent arrangement for fastening the corners of picture-frames can be made in a few minutes which will be all that can be desired and answers admirably in the case of frames that will not bear marring on the edges. Take a piece of wood 9 or 10 inches long, and 2½ square, and rebate one angle 1¼ inches deep and wide, then round off the opposite angle, and cut the piece into four pieces of equal length. Having accurately mitred the frame; lay it upon the bench and put one of the pieces of wood at each corner, the rebate, of course, fitting upon the angle, and wind a piece of quarter-inch cord twice around the frame over the corner pieces, and tie it at one corner.

Now take four pieces of smooth wood 6 inches long and twice as thick as a carpenter's pencil, insert them between the cords, one on each side of the frame, and by twisting the cord with them it can be made as tight as desired; and having seen that the mitres are good, and the frame does not wind, lay it upon the bench and pull out the bits of wood without disturbing the cord or corner pieces, lift out the frame, put a little glue upon the mitres, and replace as quickly as possible in the same position as it was be-

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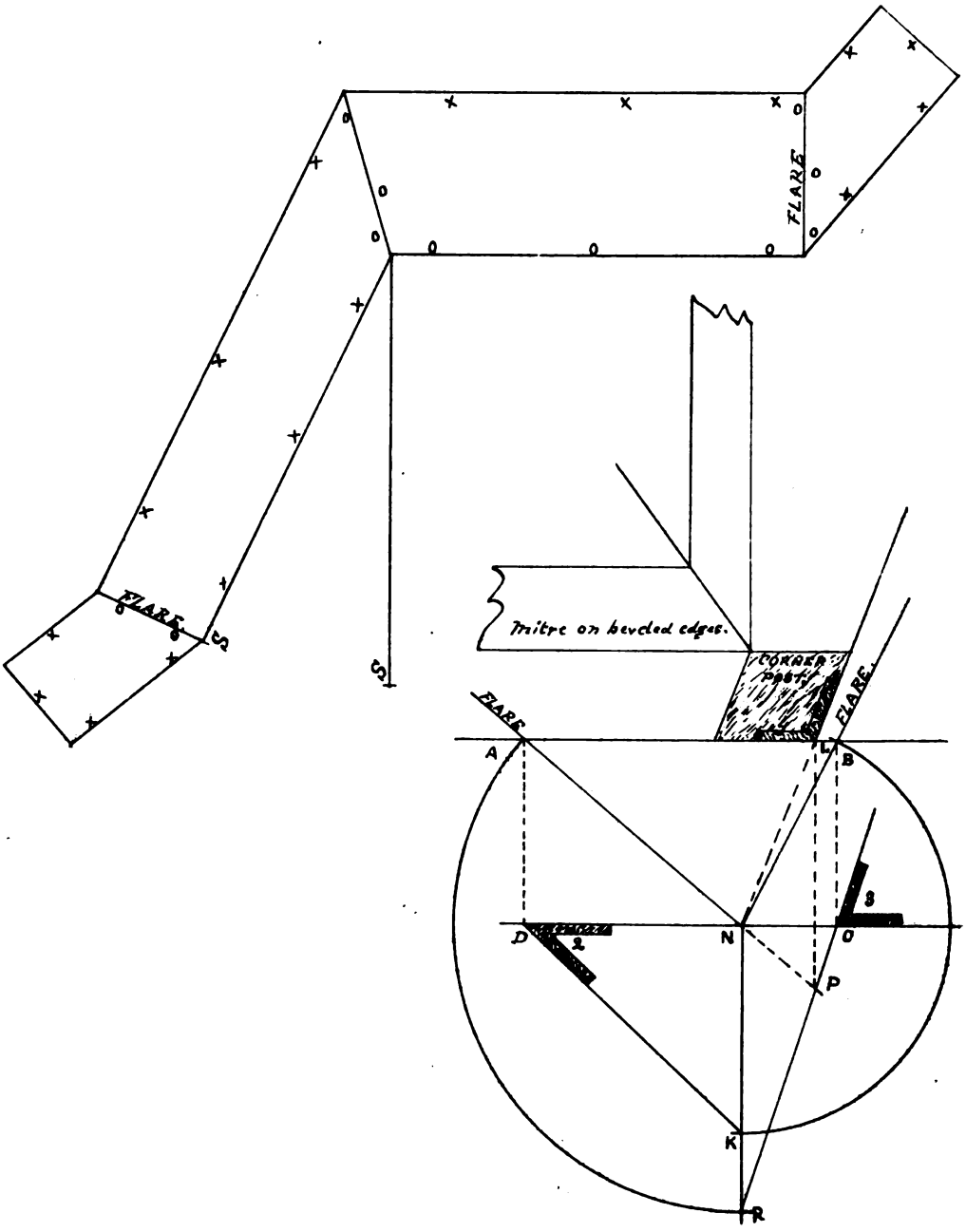
PLATE 63.



LESSONS IN PROJECTION BY ROBERT RIDDELL, ESQ.

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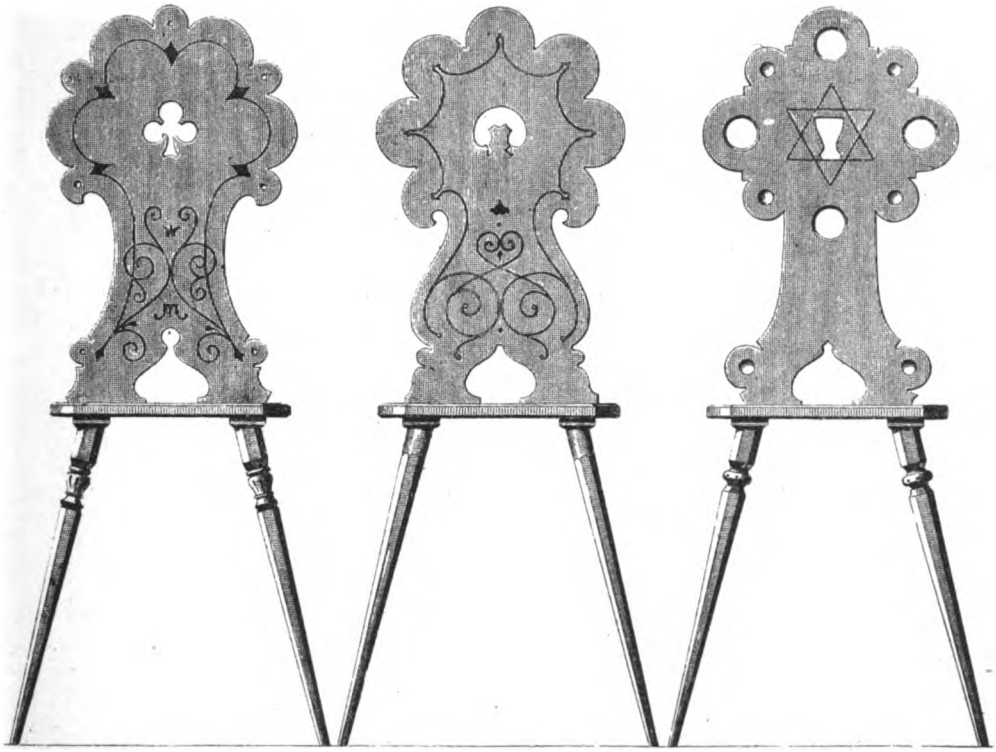
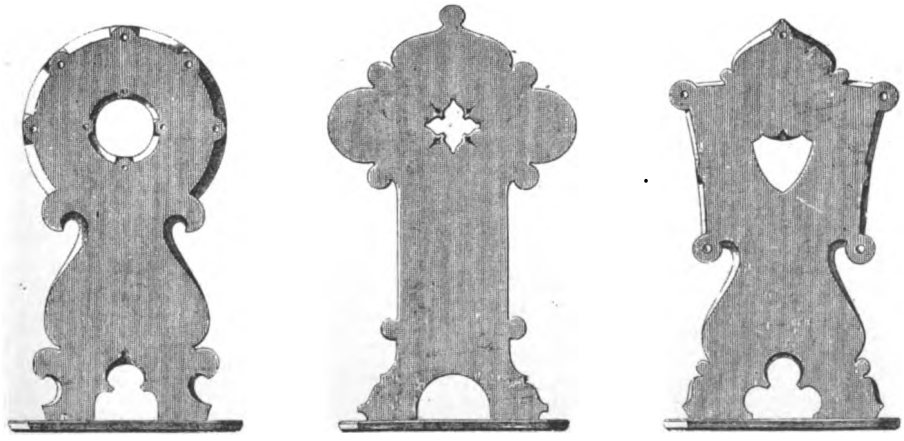
PLATE 55.





RUSTIC CHAIRS.

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stone of an ordinary pattern to be used, while the other one provides for a head and foot-board of wood Posts of six-inch square stock. Rails, etc., of two-inch stock. Perforations chamfered or not, as desired. The designer can alter either of these to suit any party, or will correspond with parties desiring details of either or any other pattern.—F. T. C.

41. COMMUNION TABLE.—I send this design (Plate 63) and description in reply to "Clericus :" Frame of 1¼-in stock ; cut panels of ½ in.; backing ⅛ in.; chamfers, fluted edges, and edges of cut panels blacked. Retable may be omitted. The designs I. H. C. and the Alpha and Omega may be cut or carved of black walnut and planted on, or may be of oak, the same as the material of the communion table itself, and gilded or blacked. Either would be very suitable. The designer will be happy to correspond with the clergyman desiring this communion table with a view to supplying him with the details.—F. T. C.

WE have received a number of answers from other correspondents, but are obliged to hold them over for want of space.

G. H. T., of Albany, N. Y., sends us a description of the "Howe Truss" in reply to Wm. E. H. Query, No. 33, and forwards a sheet of drawings in illustration. We are sorry we cannot make use of the latter, owing to the coloring, as by our process we can only reproduce drawings in ink on white paper or tracing cloth. We are always pleased, however, to receive drawings or other matter from our correspondents in reply to queries, and in this case will forward the drawings and text to the inquirer.—ED.

Useful Items for Office and Shop.

A NEW METHOD OF BENDING WOOD.—The bending of hard wood has hitherto been effected by means of hot water or steam—a process somewhat costly as regards fuel, and taking a long time. A patent has recently been taken out in Germany by MM. Bahse and Haendel for making sieve-hoops and like objects by a dry process, more cheaply and in shorter time, from cut wood. Two rollers are used, one above the other and having less velocity, so that it acts by holding back, while the lower extends the wood fibres. When the board, thus bent, leaves the rollers, it is fastened in the mouth of the sieve. The upper roller is fluted, the under one smooth. If two smooth rollers were used, a very much greater pressure would be necessary

ONE-IDEA MECHANICS.—The following remarks, from a very sensible article in the *American Machinist*, are worthy of consideration : "Many a mechanic has impaired his intellect by too intense study upon a single machine. The road to success through mechanical invention is strewn with wrecks mental as well as financial, mainly because so many anxious plodders in the old beaten track never acquire more than the one idea they had to start with, and often this is positively erroneous. It is well to persevere in a worthy effort, but unwise to run in an old rut without inclination to get out of it. We have met one-idea mechanics who would earnestly insist that their invention or discovery completely upset the elementary principles of mechanism as laid down in the books. When any astonishing claims of this kind are presented, it is well to investigate them carefully before jumping to a conclusion."

Drawings for the Million.

THE complete clearing out of our "Detail Sheets" has encouraged us to offer the following packages of valuable drawings for sale, at the extremely low price of one dollar a package.

Each package will contain over two hundred designs, with all the necessary explanations and descriptions; also, a valuable amount of building information, consisting of tables, rules, recipes, price-lists, etc.; etc. Three of these packages bound together will make a very useful work of reference for the architect, builder, carpenter, joiner, or any one connected with the building trades :

Three packages will be sent to one address for...	$2 50
Six packages for.....	4 50
Or the whole eleven packages for.....	8 00

Package No. 1 contains 238 designs of cottages, dormer-windows, verandas, consoles, barge-boards, porches, gates, door-heads, gables, chimney-tops, cornice and brackets, crestings, scroll-work, summer-house, eave brackets, stairs, full-sized sections of hand-railing, bay-window, wooden chairs, tables, writing-desks, perforated woodwork, fancy brickwork, doors, etc., etc. Price $1.

Package No. 2 contains 15 elevations with plans of cottages and villas, 3 elevations and plans of churches, also over 200 designs of piazzas, bay-window cornices, hood brackets, gable triangles, chimney caps, crestings, window-caps, trusses, dormers, doors and frames, porches, corner finish, canopies, cornice arch, screens, gutters, brick and wood work, beltings, stair-balusters, newel-posts, flues, etc., etc. Price $1.

Package No. 3 contains 39 elevations and plans for cottages, villas and dwellings; 10 elevations and plans for churches; and 146 designs for brick and stone work, shipwork, half-timbered work, verandas, drawing lessons, windows, doors, etc., etc.; also 26 designs of cornices, panels, etc., for plasterers. Price $1.

Package No. 4 contains 51 plans and elevations for cottages, villas, barns, stables, and railway stations; also, 5 plans and elevations of churches; and 115 detail drawings of scroll-work, windows, bay-windows, gables, verandas, side finish, newel-posts, shipwork, general house details, bay-window frames, frieze cornices, balustrades, oriel window, fences, gates, vestibule and front door, open timber roofs, etc., etc. Price $1.

Package No. 5 contains 72 elevations and plans of cottages, city houses, banks, villas, and country houses; also plan and elevation of schoolhouse, and 125 detail drawings of desks, counters, doors, door finish, piazzas, gables, dormers, wainscoting, chimney-cases, ceilings, front gables, porches, verandas, timber roofs, crestings, towers, vanes, stairs, mantels, balusters, newels, grilles, cornices, gateways, railing, etc., etc. This is an excellent package. Price $1.

Package No. 6 contains 38 plans and elevations of cottages, villas, and country houses; 3 plans and elevations of churches; and 155 detail drawings of fences, doors, windows, stairs, mantels, verandas, porches, stoops, carved work, gates, summer-house, newel-posts, balusters, wrought-iron work, chimney-tops, gables, examples of furniture, finials, bay-windows, dormers, hoods, arches, oriels, truncated gables, turned work, cornices, church furniture, counters, etc., etc.

Besides the above illustrative and necessary descriptive and explanatory matter, this package contains a series of illustrated papers on the use of the steel square. This package is an excellent one for carpenters and joiners who do work in the country towns, as the details are numerous and easily understood. Price $1.

Package No. 7 contains 44 plans and elevations of cottages and villas; 164 detail drawings of roofs, mantels, windows, doors, balconies, verandas, stairs, newels, piazzas, vanes, dormers, pews, church finish, chimneys, brickwork, porches, cornices, pinnacles, brick arches, etc., etc. There are also five plans and

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elevations of churches, with all the necessary details drawn to scale; also, a railway depot, plans, elevations, and details.

This is perhaps the most useful package in the whole series for the general workman. Price $1.

Package No. 8, besides containing 60 plans and elevations of various kinds of cottages and other dwellings, has also 123 detailed drawings of miscellaneous designs of a useful character; also 3 plans and elevations for a stable; a tenement-house, and 41 cuts illustrating saw-filing in all its branches.

This package also contains a series of papers on saw-filing that cannot fail to be useful to the operative mechanic. Price $1.

Package No. 9 contains 73 plans and elevations of building; 36 designs for centre-pieces, cornices, and other plasterwork; 2 churches, stable with all the necessary drawings, and the usual amount of detail drawings; also 7 cuts illustrative of saw-filing, including all necessary descriptive and explanatory matter. Price $1.

Package No. 10 contains over 30 elevations and plans of handsome cottages; 3 for churches, one a frame showing all the details and framework; also three stables, a town bank with details of interior finish, showing desks, counters, screens, teller's office, etc., etc. This package also contains 30 illustrations on hand-railing with all necessary text, and the usual amount of detail drawing.

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Package 11 contains a large number of illustrations consisting of cottages; 36 examples of ornamental brickwork; 40 examples of plasterwork, panels, cornices, centre-pieces, etc., etc.; also full sized details of cottage finish. This package also contains the plans and elevations of a store, with a full set of details, showing front, counters, shelving, cornices, cases for goods, tables, and all other necessary details. There are also a number of designs for gates and fences, and many other useful drawings. This is one of the best packages in the series. Price $1.

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The following Contents for June number will give a general idea of the character of the Journal:

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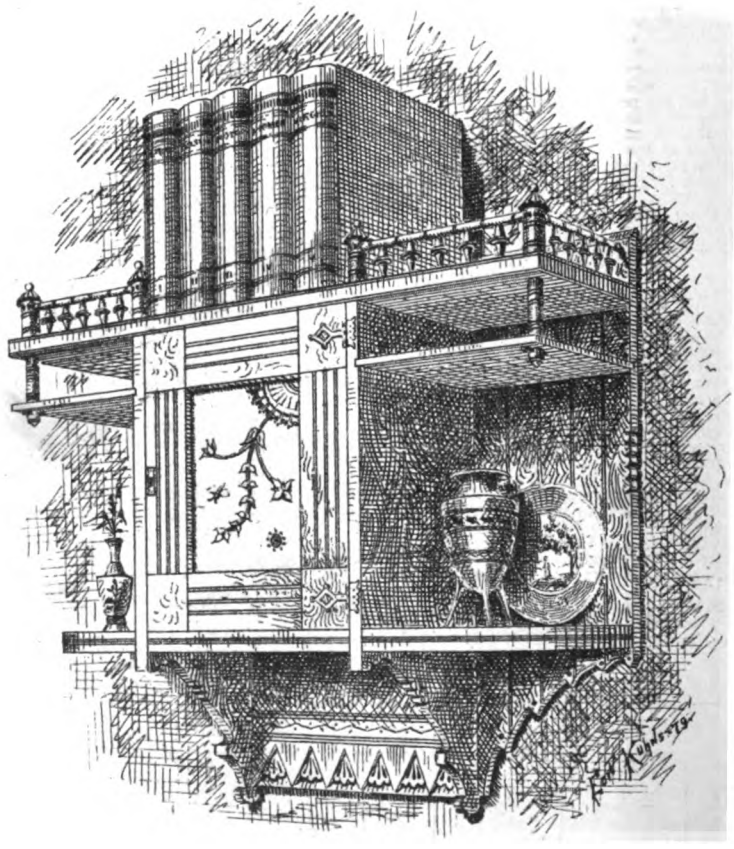
PLATE 64.



Hanging Cabinet.

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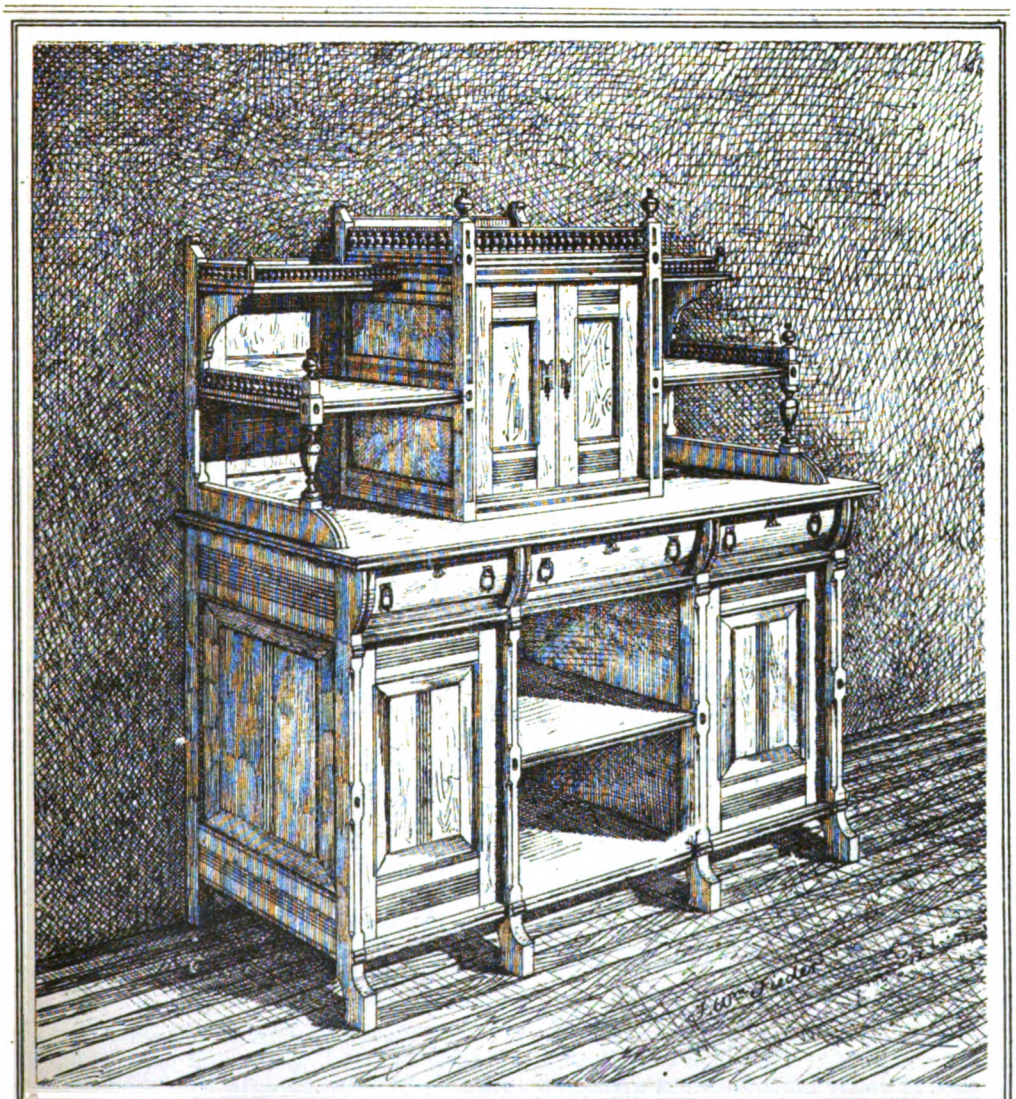
THE ILLUSTRATED WOOD WORKER

FOR JOINERS, CABINET MAKERS, STAIR BUILDERS, CARPENTERS, CAR BUILDERS, &c. &c.

VOL. I NO. 9 SEPTEMBER, 1879. PRICE TEN CENTS.



F. Wm. Fieder Archt. DESIGN FOR SIDE-BOARD. 176 Broadway N.Y.

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OFFICE:

No. 176 Broadway, New York City.

CHAS. D. LAKEY, *Publisher.* FRED. T. HODGSON, *Editor.*

All correspondence intended for the columns of the WOOD-WORKER should be sent to the Editor; but letters of a business nature, or which contain money or Post-Office orders, should be addressed to the Publisher. Rejected communications will not be returned unless the persons sending them remit return postage.

Entered at the Post Office at New York as second-class matter.

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ILLUSTRATIONS.

Design for a Sideboard; Handrailing; Practical Carpentry; Ottoman Sofa; Small Japanese Cabinet; Lessons in Projection; Drawing-room Chair; Examples of Swiss Architecture.

Our Illustrations.

ON the title-page this month we show a design for a sideboard. This design was prepared by F. W. Fieder, and is simplicity itself; any amateur, having the necessary tools and a small turning lathe, ought to be able to make a sideboard from this design. The standards in front would require to be taken out of stuff 1¾″ x 6″ and cut down in their narrowest section, to about 3″ wide. The fronts can be shaped out with a Barnes' foot scroll-saw, and afterwards chamfered and finished off. The ends are framed together and panelled. The railing on the top is formed of small turned balusters, with pins formed on the upper and lower ends to fit into holes bored in the shelves and rails. The doors are framed in the ordinary way, with the edges of the stiles and rails chamfered at the panels. The wide marginal mouldings on the lower door panels are formed of thin stuff, mitred at the corners and glued in.

The back may be enclosed with thin matched stuff about three or four inches wide, beaded at the joints. The whole construction is simple and easily understood. Further information can be obtained, if needed, by addressing the editor.

Plate 66 is illustrative of the Articles on "Sectorian Hand Railing." Full explanations will be found on page 134.

On Plate 67 we show the best methods of obtaining the lengths and bevels for all kinds of rafters for a variety of hip roofs. This is an excellent plate for the carpenter. Full explanations are given on page 134.

On Plate 68 we show an Ottoman sofa, designed by Edward Dewson, architect and art designer, of Boston.

Plate 69 was also designed by Mr. Dewson. The construction is very simple, and the whole design is honest and pure, and if executed in appropriate woods, will make a very handsome piece of furniture.

Plate 70 is another of those graphical methods of solving difficult problems in practical carpentry that have recently been furnished us for the benefit of our readers, by Mr. Robert Riddell. This is an exceedingly useful problem, and should be thoroughly mastered by all young mechanics who desire to be adepts in the art of Hand-railing.

On Plate 71 we show a very handsome design for a drawing-room chair which is intended to be finished in black and gold. The design was prepared by Mr. Dewson, of Boston, and we are sure it will be appreciated by many of our patrons.

We have frequently been asked to publish examples of Swiss architecture, and details of interior finish. In compliance with this request we have reproduced on Plate 72, 13 examples of brackets and cornices in the Swiss style; we may add, also, that we have instructed our artist to prepare one page of designs of a similar nature to this, for each remaining month of the current year.

THAT the WOOD-WORKER would make a first-class vehicle for advertising is made manifest by the fact that since we offered the "cheap drawings" for sale through its columns, the demand for them has been so great that our large stock has been completely sold out, and we are continually obliged to refuse orders which come pouring in upon us from every quarter of the globe. We also advertised "DRAWINGS FOR THE MILLION," and, although we had many thousands of copies of these on hand, they are rapidly disappearing; and as we have employed no other medium than the WOOD-WORKER, for making public our desire to sell these drawings, it is quite evident that it is to its agency we owe our numerous sales.

THE month of August has been unusually prolific of kind words and more substantial proofs of high regard in which our efforts are appreciated by our patrons. The public prints, too, have shown us many instances of

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kindness and appreciation, and have actually done us good service by their favorable notices, for which they have our heartiest thanks.

WHILE speaking of ourselves, it may be as well to say to those of our readers who intend procuring full sets of our "Drawings for the Million," that our stock is rapidly disappearing, and we cannot promise to furnish complete sets after the expiration of the present month; parties, however, who are desirous of obtaining the eleven packages, and who have not the full amount of money to send for them all at once, can, by sending what money they may have in hand, and expressing a desire to have all the drawings complete, have them held for them *one month*. That is, we will send packages for the amount of money sent us, and will hold the remaining packages over one month, when, if the balance of eight dollars is sent, we will forward them to the person who sent the order. We make this offer because we have had a number of orders for single packages, where the parties ordering have expressed a desire to obtain the whole set, but did not have sufficient means at the time to procure them, and have since sent us orders for other packages. Our proposition will enable buyers of this class to obtain the whole set at the lowest rates. Orders should be sent at once, as the supply may give out any day.

IN a recent communication to the Mulhausen Gewerbverin, Herr Schoen said he had tried to give oaken objects an old look by rubbing aniline oil on them, but without good results; the wood took a color which rather reminded one of mahogany, and was but very superficial. On the other hand he got a dark-brown tone similar to that of old oak by saturating the wood first with a solution of aniline salt (sulphate of aniline), and then with caustic soda. Similar results were obtained with walnut and plum-tree wood, etc. Caustic potash alone, of course, gave a somewhat similar action, but inferior to that with simultaneous use of aniline salt. Herr Schoen further attempted to color wood black by treating it successively with aniline salt, bichromate of potash and caustic soda, the wood being dried after each operation. The color thus obtained is very regular. The experiment succeeded with all the kinds of wood tried—the most important home species and some foreign. These coloring methods are quickly and easily carried out, and are very inexpensive.

THE largest furniture manufactory in St. Louis is a coöperative concern, each of the 110 skilled workmen being a holder of at least one share, and not more than twenty, at $25 each. They are chiefly German Socialists. Only ten per cent of the capital was paid in at first, credit being obtained for about $20,000 of wood-working machinery, and the dividends have since been sufficient to meet the assessments as they fall due. The men receive ordinary wages for their work, and thus far there has been no serious dispute in the management, which is vested in a committee.

AN interesting exhibition of furniture, antiquities, etc., has been held at Munster, the capital of Westphalia. The exhibition comprises furniture, tapestry, pictures on wood and metal panels, old wood-carving, glass-painting and porcelain, lace, etc. A whole series, amounting to nearly 700 pieces of church plate, etc., arranged according to date, and including 70 chalices dating from the eleventh to the seventeenth century, and over 80 reliquaries and some bishop's staves, were on view.

AMONG the exhibits forwarded from Auckland, New Zealand, to the Sydney Exhibition, will be a fine collection of the beautiful ornamental woods of the province of Auckland. The specimens will include five varieties of mottled kauri, among which is one known as the fern-leaf variety—a beautiful specimen of this rare sort. There are also samples of mottled totara, puriri, and rewarewa. In ornamental woods for cabinet purposes there is no country in the world which produces greater variety or specimens of greater beauty than the province of Auckland. The half of each slab of wood to be exhibited is to be polished, and the other half is to be left in its natural state.

THE making of wooden shoes has become an industry of considerable magnitude in France. They are produced there to the extent of 4,000,000 pairs annually. In Alsace and Barriers they are made by machinery, and in Lozere by hand. In the last named province 1700 persons are engaged in the manufacture, and the yearly product is 564,000 pairs.

WE are assured that the furniture manufacturers of New York are greatly encouraged at the prospects of the fall trade, after having received and digested the voluminous and very valuable advice so kindly tendered by the champion modest men of Boston and Chicago.

IN one week recently the furniture exports from New York amounted to $2016 to the Dutch West Indies; $2488 to Glasgow; $1094 to the British West Indies; $885 to the United States of Colombia; $610 to the Argentine Republic; and $3318 to other twelve ports, making a total of $10,371.

ONE feature of the increasing exportation of American manufactures is machinery-made joinery. We have exported to England in a single year as many as 100,000 doors.

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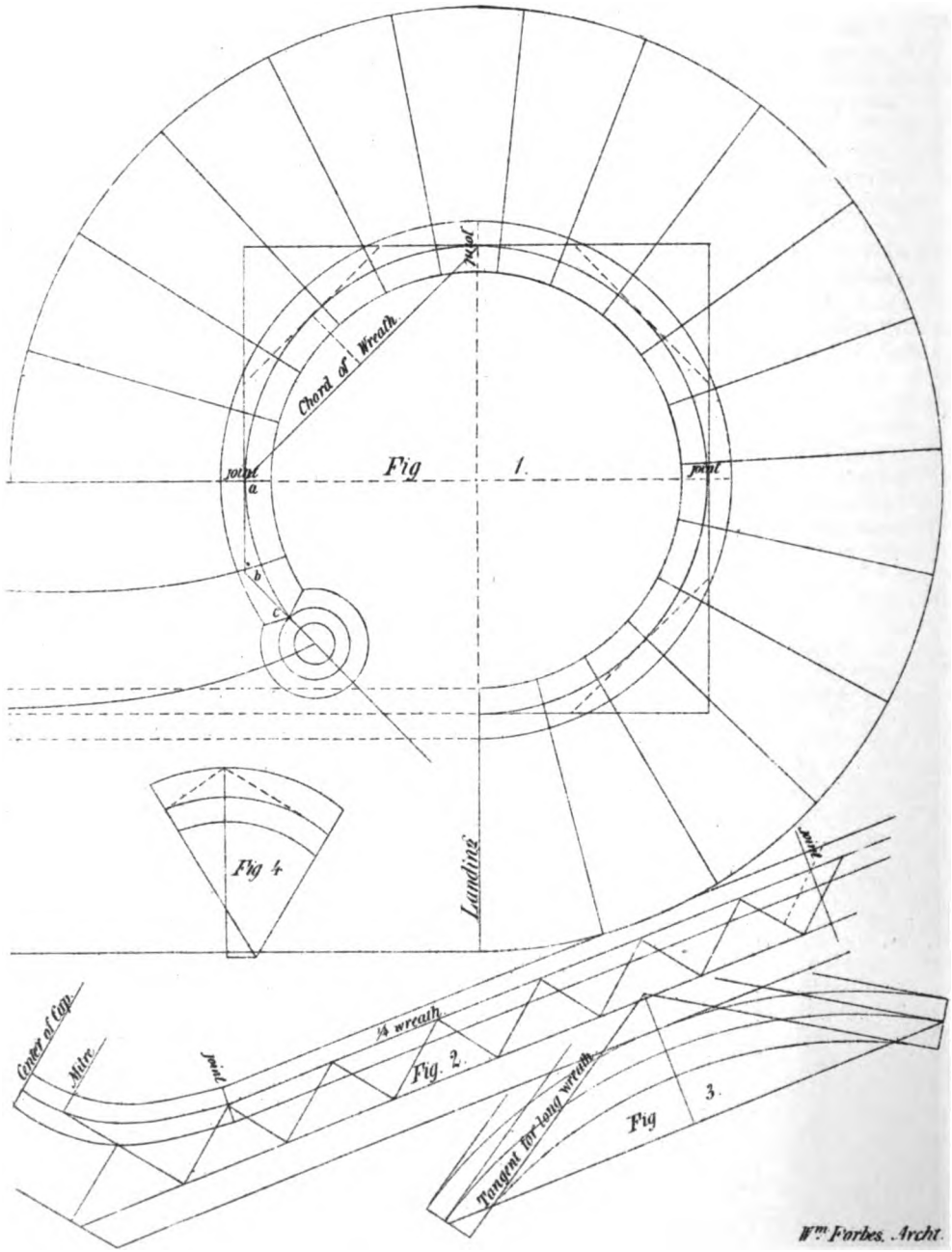
PLATE 66



THE SECTORIAN SYSTEM OF HAND-RAILING.

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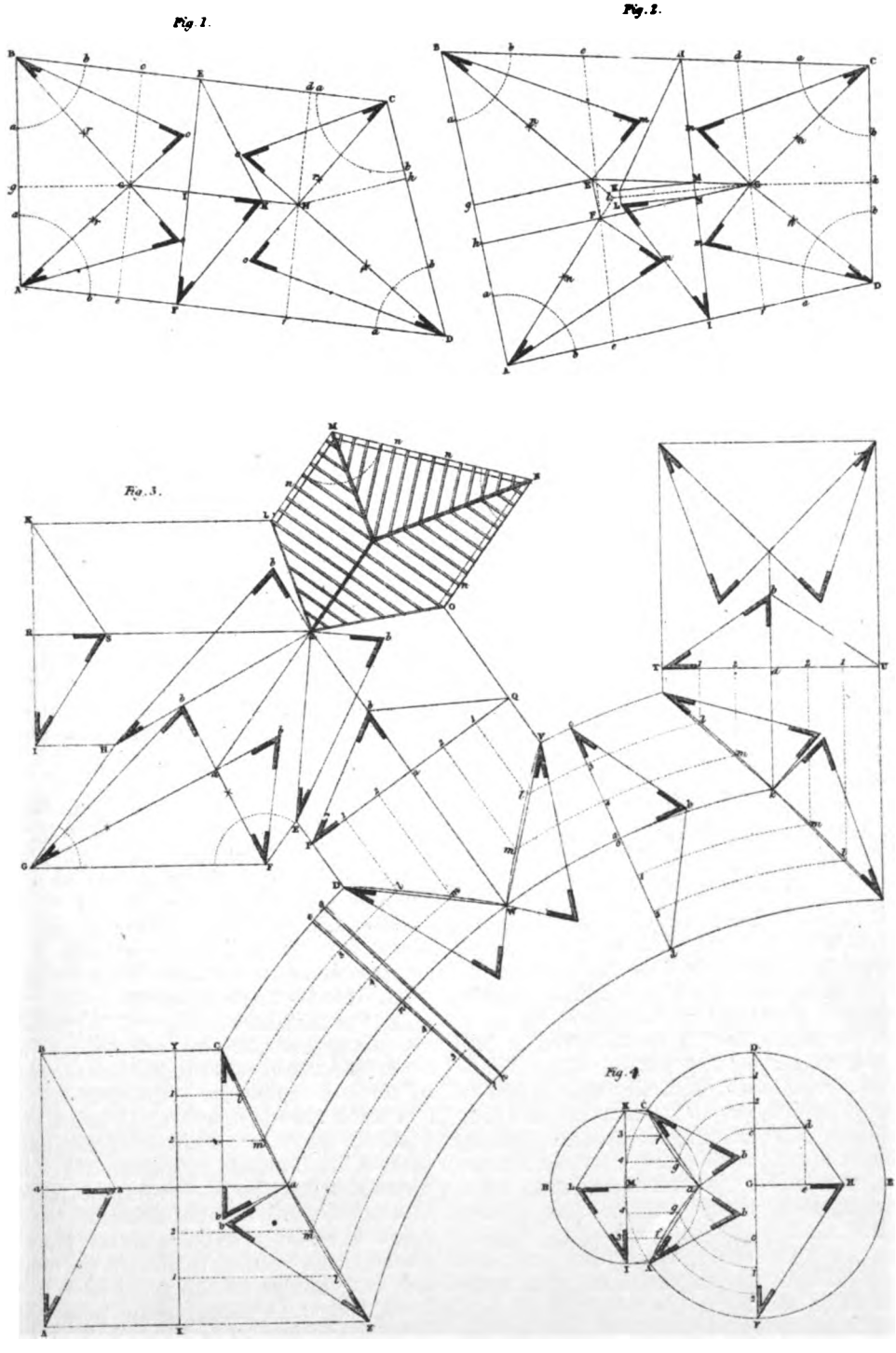
PLATE 67

ROOFS.

HIP ROOFS.



PRACTICAL CARPENTRY.

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SEND two postage stamps (six cents) to this office for a copy of "Hints on Estimating," a pamphlet of thirty-two pages. It gives the prices of labor and material, for all kinds of work connected with the building trades.

OUR eleven packages contain over 5000 hints, rules, tables and recipes, of great value to the carpenter, joiner, builder or contractor.

Lessons in Projection.

BY ROBERT RIDDELL, TEACHER OF THE ARTISAN CLASS IN THE HIGH SCHOOL, PHILADELPHIA.

Plate 70.

ON the problem shown in this plate rests the true theory of hand-railing, and the student should thoroughly master it in every particular. The correctness of the method shown for obtaining the ellipse N may be proved by cutting the lines XXXX through the paper, and then folding over the lines OOOO, and then raising the cut parts until S A stands perpendicular over the plan D. The curve N will then stand directly over the quarter circle on the plan. The methods of finding the long and short diameters, and the foci of the ellipse, have been explained in previous issues of the WOOD-WORKER. Pins are placed in the foci in order that the ellipse may be described by the aid of a thread or fine string; this process will be readily understood by referring to Fig. 1, Plate 22, March number.

We would advise the student to copy this plate entire two or three times, or until the principle involved is thoroughly understood, and the knowledge gained will doubly repay the trouble.

The Sectorian System of Hand-Railing.

NINTH PAPER.

Plate 66.

THIS plate exhibits a full circle stairs, and the well-hole enclosed with tangents, either for quadrant or octagon angles, by which wreaths in either four or eight pieces can be obtained. Where all the divisions are made equal, the same moulds, both face and falling, will answer for any section of rail. The moulds are applied, and all the twists and ramps obtained, as laid down in preceding examples. The framing is as easily put up in this example as the one shown in former plates, and is the most economical of any I have ever used in my practice, and equally as substantial.

Fig. 1 shows the ground plan, and had best be laid down on the floor where required to be built.

Fig. 2 is the stretch-out of the wreath piece for one fourth of the circle, and is best where it is the desire to avoid many joints, though I do not see the same objection to joints that many do, when properly made. I would prefer a joint to a cross-grained piece in a wreath always.

Fig. 3 is the quarter-wreath piece, obtained in the usual way, with its tangents and chord line, segment, etc.

Fig. 4 is the lower wreath face mould, with the tangents as obtained from A, B, C, Fig. 1, and drawn as shown on this figure. The lower end of Fig. 2 gives an idea of the falling ease, and is the shape of the centre falling mould, the convex and concave falling moulds being obtained as in former examples.

Practical Carpentry.

HIP-ROOFS.

IN its most simple form the *hip-roof* is a quadrilateral pyramid, each triangular side of which is a *hip*, and the rafter in each angle is a *hip-rafter*. The *common rafters* which lie between the hip-rafters in the planes of the sides of the roof, and which, by abutting on the hip-rafters, are necessarily shorter than the length of the sloping side, are called *jack-rafters*.

The things required to be determined in a hip-roof are these, viz.:

1. The angle which a common rafter makes with the plane of the wall-head—that is, the angle of the slope of the roof.
2. The angle which the hip-rafters make with the wall head.
3. The angles which the hip-rafters make with the adjoining planes of the roofs. This is called the backing of the hip.
4. The height of the roof.
5. The lengths of the common rafters.
6. The lengths of the hip-rafters.
7. The length of the wall-plate contained between the hip-rafter and next adjacent entire common rafter.

The first, fourth, fifth, and seventh of these are generally given, and then all the others can be found from them by construction, as is about to be shown.

The plan of a building and the pitch of the roof being given, to find the lengths of the rafters, the backing of the hips, and the shoulders of the jack rafters and purlins:

PLATE 69.—Let A B C D (*Fig.* 1) be the plan of the roof. Draw G H parallel to the sides A D, B C, and in the middle of the distance between them. From the points A B C D, with any radius, describe the curves *a b*, *a b*, cutting the sides of the plan in *a b*. From these points, with any radius, bisect the four angles of the plan in *r r r r*, and from A B C D, through the points *r r r r*, draw the lines of the hip-rafters A G, B G, C H, D H, cutting the ridge line G H in G

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and H, and produce them indefinitely. The dotted lines *c e, d f*, are the seats of the last entire common rafters. Through any point in the ridge line I, draw E I F at right angles to G H. Make I K equal to the height of the roof, and join E K, F K: then E K is the length of a common rafter. Make G *o*, H *o* equal to I K, the height of the roof; and join A *o*, B *o*, C *o*, D *o*, for the lengths of the hip-rafters. If the triangles A *o* G, and B *o* G, be turned round their seats, A G, B G, until their planes are perpendicular to the plane of the plan, the points *o o*, and the lines G *o*, G *o*, will coincide, and the rafters A *o*, B *o* be in their true positions.

Let A B C D (*Fig.* 2) *be the plan of an irregular roof, in which it is required to keep the ridge level:*

Bisect the angles of two ends by the lines A *b*, B *b*, C G, D G, in the same manner as before; and through G draw the lines G E, G F parallel to the sides C B, D A, respectively, cutting A *b*, B *b* in E and F; join E F: then the triangle E G F is a flat, and the remaining triangle and trapeziums are the inclined sides. Join G *b*, and draw H I perpendicular to it: at the points M and N, where H I cuts the lines G E, G F, draw M K, N L perpendicular to H I, and make them equal to the height of the roof: then draw H K, I L for the lengths of the common rafters. At E set up E *m* perpendicular to B E; make it equal to M K or N L, and join B *m* for the length of the hip-rafter; and proceed in the same manner to obtain A *m*, C *m*, D *m*.

To find the hip and valley rafters of a compound irregular roof (*Fig.* 3):

In the compound roof shown by the plan, in which the ridge is level throughout, although the buildings are of different widths, the method of proceeding to find the hip and valley rafters of the right-lined parts of the roof is the same as in the two former cases, and will be evident on inspection. In the circular part proceed as follows: Draw *c d* a radius to the curve, as the seat of one pair of the common rafters *c b*, *d b*, and bisect it in *a*: through *a* describe the curve *k a* W *n a*, which is the seat of the circular ridge: produce the lines of the other ridges to meet this curved line in *a* W *k*, and connect the angles of the meeting roofs with these points, as in the drawing: divide the seat of one pair of the common rafters in each roof, as X Y, P Q, T U, and *e f*, into the same number of equal parts; and through the points of division draw lines parallel to the sides of their respective roofs, intersecting the curved lines drawn through the points of the curved roof; and through the points of intersection draw the curves C, *l*, *m*, *a*, etc., which give the lines of the hips and valleys. On C *a*, the meeting of the left-hand roof with the circular roof, erect *a b* at *a*, and make it equal to the height of roof; and join C *b* for length of valley rafter: proceed in the same manner for the hip-rafter Z *b*; and for the other hip and valley rafters.

To find the valley rafters at the intersection of the roof B *with the conical roof* E (*Fig.* 4):

Let D H, F H be the common rafters of the conical roof, and K L, I L, the common rafters of the smaller roof, both of the same pitch. On G H set up G *e* equal to M L, the height of the lesser roof, and draw *e d* parallel to D F, and from *d* draw *c d* perpendicular to D F. The triangle D *d c* will then by construction be equal to the triangle K L M, and will give the seat and the length and pitch of the common rafter of the smaller roof B. Divide the lines of the seats in both figures, D *c*, K M, into the same number of equal parts; and through the points of division in E, from G as a centre, describe the curves *c a*, 2*g*, 1*f*, and through those in B, draw the lines 3*f*, 4*g*, M *a*, parallel to the sides of the roof, and intersecting the curves in *f g a*. Through these points trace the curves C *f g a*, A *f g a*, which give the lines of intersection of the two roofs. Then to find the valley rafters, join C *a*, A *a*; and on *a* erect the lines *a b*, *a b* perpendicular to C *a* and A *a*, and make them respectively equal to M L; then C *b*, A *b* is the length of the valley rafter, very nearly.

Correspondence.

We invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of Illustrated Wood-Worker:

THE packages of drawing received all right; am very much pleased with them, also with "Hints on Estimating," which is well worth the money. I take the WOOD-WORKER through our news-agent here, and like it very much and join with Mr. Randolp in wishing that it might be published weekly, as it is a first-class paper and suited to the wants of all wood-workers.

E. D. SAWIN.

SPRINGFIELD, VERMONT, Aug. 4, 1879.

Editor of Illustrated Wood-Worker:

I HAVE taken your ILLUSTRATED WOOD-WORKER from the first, and am much pleased with it. There are many fine designs contained therein, but still there seems to be something wanting especially to the *Amateur*, and that is, a working model and a guide for measurement. I think each book-case, etc. should have a skeleton drawing accompanying it, so marked that it could be easily determined how to put it together. The outside does not give any idea of how the inside is

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PLATE 68

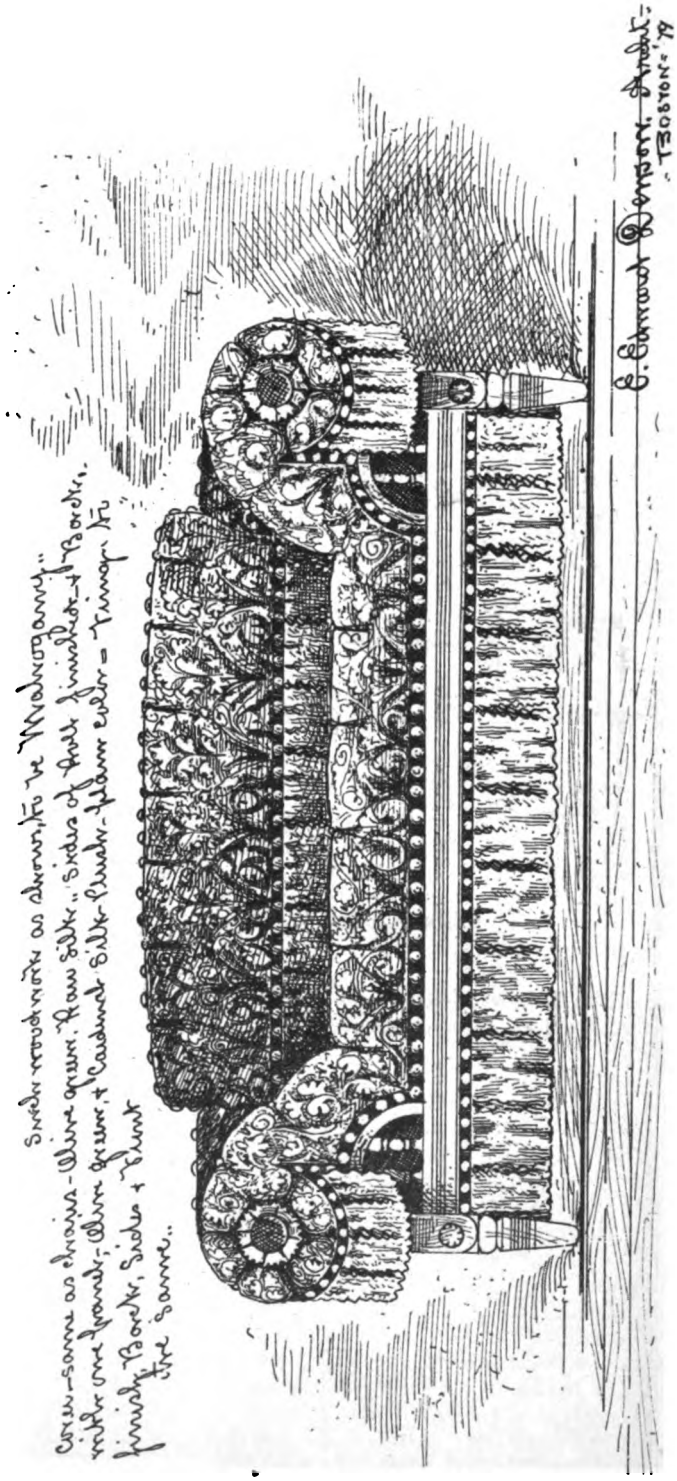
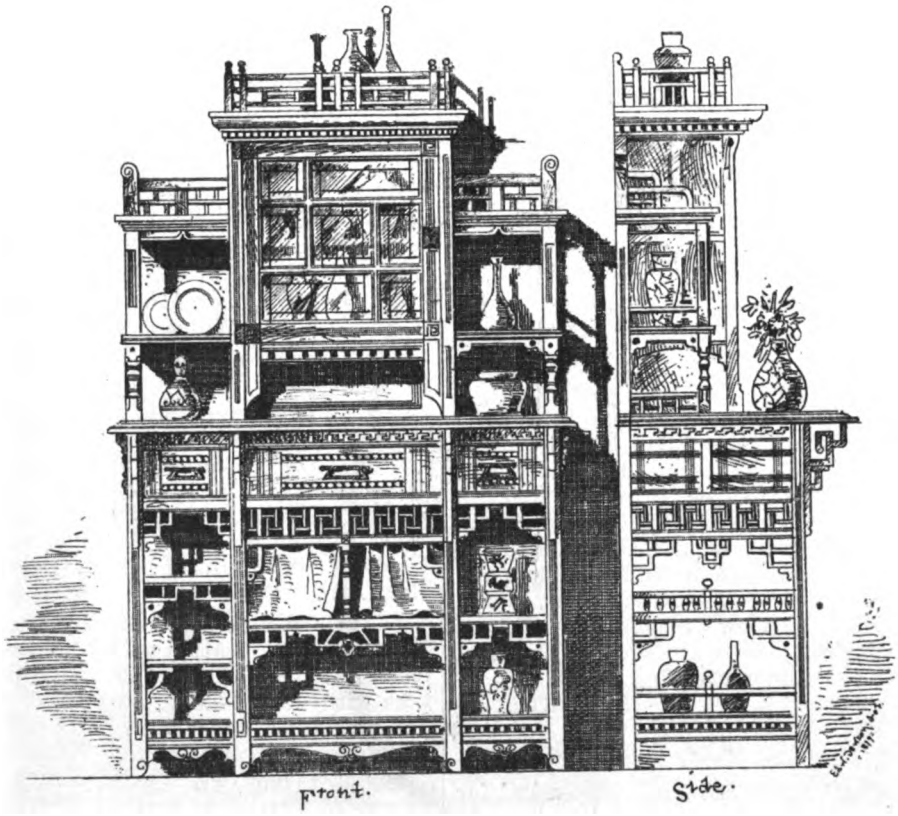


PLATE 69



E. Edmund Benson. Archt.
Boston.

Small Japanese Cabinet.

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arranged. Then a scale of measurement would also be very handy so that one would know what thickness of wood to use, what height, width, length, etc., the articles are to be. I would like if some of the designers for your paper would draw some pretty models for statuary pedestals, solid and skeleton, giving dimensions; also some cornices for lace curtains in different styles (with pole and rings especially). The department of cabinet work is the one which interests me most and I hope to see it occupy a prominent place and that a variety of designs will be given including all that would be necessary to furnish a parlor, etc. AMATEUR.

BROOKLYN, N. Y, Aug. 9, 1879.

Editor of the Illustrated Wood-Worker:

I FIND your paper very interesting and instructive in many respects, but as I am a pattern-maker by trade, I should like to see something in that trade once in a while. I presume, however, that my trade is out of your line, and that your paper is designed especially for carpenters, joiners, and cabinet-makers; an item, however, now and again, bearing on my vocation, would be very acceptble to me, and would, I am sure, be of interest to many of your subscribers.

ALBERT B. ENTWISLE.

SPRING CITY, July 30, 1879.

Editor of the Wood-Worker:

HAVING for some time past been trying to master the art of carpentry and joinery, and not feeling satisfied with the manner in which I am progressing, I thought I would ask you if it would be better for me to try and procure a situation under some good builder in a city—if so, is there any choice in location? 2. How can one find a good, reliable builder who will lend his aid and good-will to an apprentice?

APPRENTICE.

Editor of the Wood-Worker:

IN answer to David A. Hall, who asked for a reply in July issue of the *W. W.*, I would say that the figure on the left (Plate 37) represents the desk finished; the one on the right, the inside arrangement. The cresting shown under the shelves, is stamped leather. The ornamentation of panels, drawers, etc., is incised work, and may be finished in black or gold, or left plain. The total cost of lumber, mouldings and furniture, was about twenty-six dollars.

GEO. O. WOODCOCK.

CLAREMONT, N. H. Aug. 7, 1879.

[Communications received from T. M., Central Square, N. Y., W. H. Croken, Orillia, Ont., and several others.—ED.]

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

63. STATUARY.—If a St. John was to stand thirty feet up from the pavement on a corbel, on a church tower, what would be a proper height to give the figure from sole to crown?

O. K.

64. TEST.—Will you, or some of the readers of the WOOD-WORKER, give a test for pure linseed oil? Answer through the WOOD-WORKER.—SPRING-BEVEL.

65. ROSEWOOD.—If some kind fellow-reader of the WOOD-WORKER will kindly inform me how to imitate rosewood, I shall be very much pleased.—KNOT.

66. CARVINGS.—I am an amateur wood-carver, and have done some work that my friends pronounce as creditable, I wish to polish it, but am unacquainted with the process of polishing work of this kind; will some of your readers who understand it be kind enough to inform me how it is done?—RICHARD.

67. DECORATION.—Please inform me how house flower-pots are decorated with "decalcomanie?" I have tried to ornament flower-pots with decalcomanie on several occasions and have failed every time. Any information or hints will greatly oblige.—NELLIE.

68. MORTISE AND TENON.—What is the proper proportion of a tenon and mortise to the size of the timber operated upon?—CARPENTER.

69. VENEER.—Please inform me how a veneered surface can be cleaned and prepared for varnish or polishing?—TYRO.

70. FURNITURE PASTE.—Will some kind reader inform me how furniture paste is made?—IRISHMAN.

71. PICTURE FRAME.—How are the figures on panels, plates 25, 33, 41, etc., produced; simply cut out of the wood, or are they inlaid? If incised, are they stained or painted? What tools are used? Wood carvers', or can it be done with more common ones?

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Would like a design for a handsome picture frame—quite heavy—about 2 x 3 feet, square corners.—WHITTLER.

72. DRAWINGS.—Will you or some of your readers inform me if there is a work published that gives instructions in painting drawings, and shows samples of same? Also give price of same and oblige.—J. P. R.

73. FLOWER STAND.—I would take it as a favor if some of your talented contributors would publish a design for a flower-stand in your pages. A stand with three shelves would suit me best. Permit me to thank Mr. F. T. Camp for the design he published for a communion table; he may hear from my part of the country before long.—CLERICUS.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

49. TOOLS.—With respect to choosing the tools used in the cabinet trade, the most necessary are planes, saws, and chisels. We will consider them, first, with respect to the wood of which they are manufactured, and secondly, the steel which forms their cutting edges. Beech is, in general, and should be always used for the stocks, handles etc., as it is of a tough texture, and not liable to split and warp as other woods. There are two kinds of beech, usually known by the names of black and red beech, and the white beech. The former is by far the best in every respect, and may be always known by its color and fineness of grain, which are darker and firmer. The white is more apt to warp, and soon wears with use; it should, therefore, never be employed for tools. If you examine a piece of beech endwise you will perceive the grain runs in streaks, which among workmen is called the *beat* of the wood; in all planes the beat, which is the hard, fibrous particle of the wood, runs in a direction perpendicular to the face of the plane, which in that case appears full of little hard specks; whereas, if the beat runs parallel to the face it will appear in irregular streaks, which situation of the grain should always be avoided, as the face will be apt to wear uneven, and more subject to warp and twist. In saw-handles the beat should run in the same direction as the blade. In moulding-planes it is very frequently the case that pieces of boxwood are let into that part of the face that forms the quirk of the mouldings; but this, when possible, should never be done, as the two woods are very different, and the different temperature of the atmosphere will cause a difference in the contraction and expansion, and consequently the plane will be liable to warp.

The steel in all tools used by the cabinet-maker should be of the best quality and tempered slightly harder than the tools used by a carpenter or joiner. Edge tools as a rule get softer as they wear away. When a good tool is once obtained it should never be parted with. Never let a tool get rusty, as the corrosion eats into it, and it never gives satisfaction afterward.—RASP.

50. EBONIZING.—1. Eight parts tincture muriate of iron, 7 parts solid extract of logwood, 37 parts alcohol or methylic spirit (called wood-alcohol), or brush over first with spirit and logwood; afterward apply the iron. This rule—using no water—will not raise the fibre, and so make unnecessary work to smooth the surface again. Cherry wood is best for ebonizing. Beech and maple come next, or a good hard piece of white wood will do very well. 2. Brush over freely with a saturated solution of logwood in warm water, rub off with a dry cloth to prevent a gummy coat. Let it dry a few hours and then apply *vinegar* in which *clean iron filings* have soaked for a few days. Finish with furniture oil well rubbed in. This is very simple as the materials are easily obtainable anywhere. 3. Wash the wood repeatedly with a solution of sulphate of iron, let it dry, then apply a hot decoction of logwood and nut galls two or three times. When dry wipe it off with a wet sponge, let dry again, and polish with oil. Won't "Ebenezer," question 51, please report his success if he tries this?—WHITTLER.

52. HIGH BUILDINGS.—Perhaps the following will suit "Aspire." The dome of St. Peter's at Rome, is 432 feet above the ground. The dome of St. Paul's, in London, has a height of 330 feet. Strasburg Cathedral spire has an elevation of 466 feet; Amiens, 422 feet; Chartres, 371 feet; Salisbury, 387 feet. The towers of Notre Dame, at Paris, measure only 224 feet; the Pantheon, 267; the dome of the Invalides, 310; and the Arc de Triomphe, the largest triumphal arch in the world, 161 feet. The beautiful spire of Milan glistens in the air at an elevation of 400 feet; the spire of the Hotel de Ville, at Brussels, is 364 feet high, and the famous leaning towers of Pisa and the Assinelli, at Bologna, have elevations respectively of 180 feet and 321 feet, the latter measurement including the lantern. Upon the dome of St. Sophia, at Constantinople, the crescent now glistens where formerly the cross was planted,

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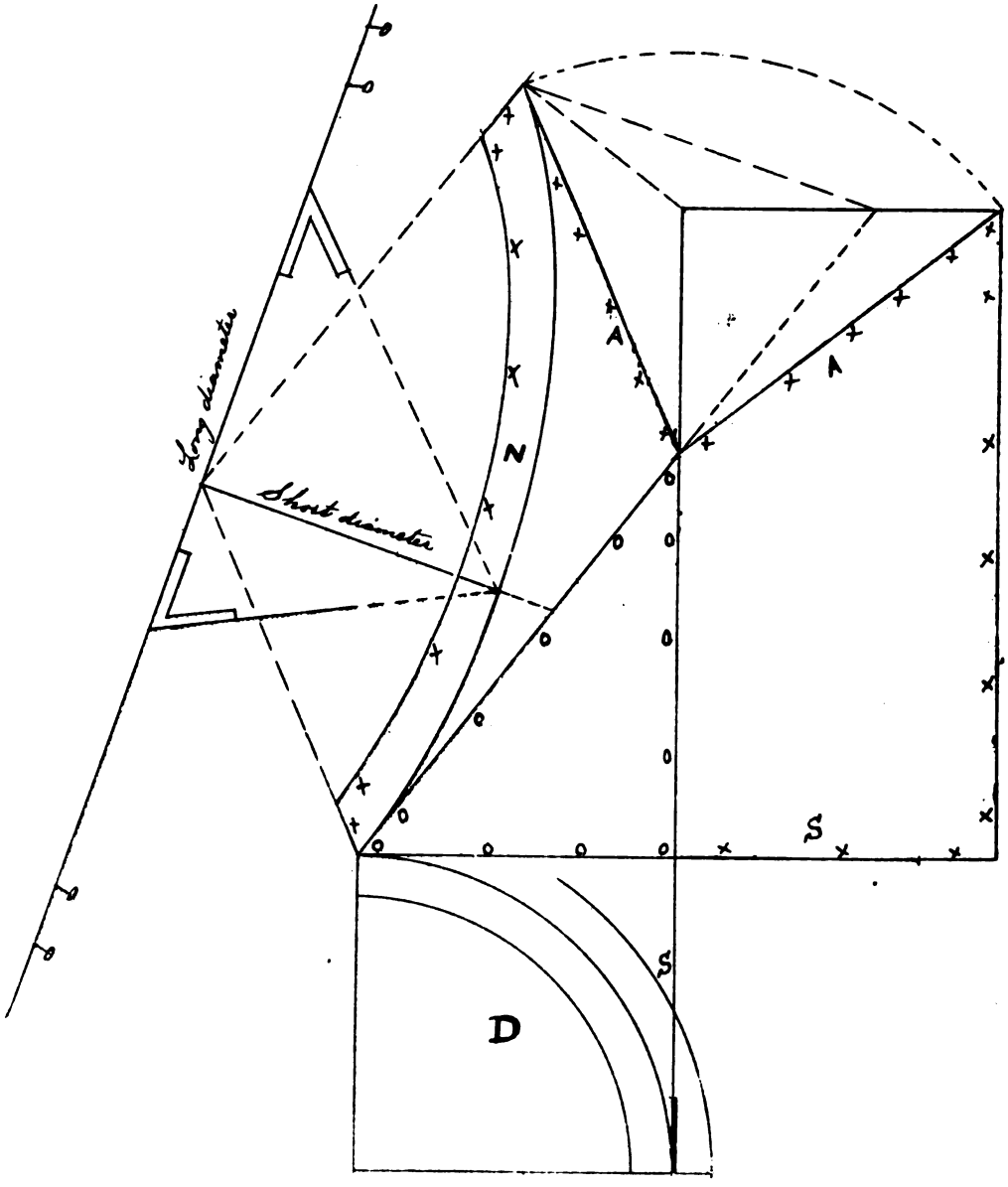
PLATE 70



LESSONS IN PROJECTION BY ROBERT RIDDELL, ESQ.

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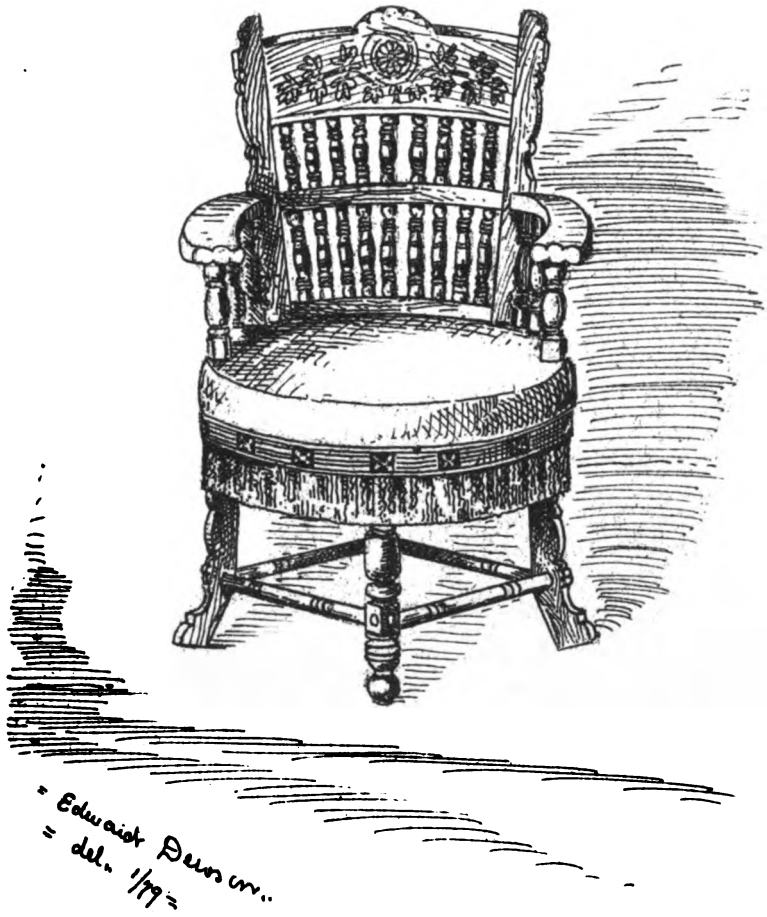
PLATE 71



DRAWING-ROOM CHAIR.

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at an elevation of 182 feet. Hitherto the pre-eminence in height has been accorded to the great pyramids. That of Cheops is 484 feet, according to Smyth; that of Chephern is 454 feet, and that of Mycerimus 218 feet. Now, however, we are told that the new spire of Rouen Cathedral has overtopped the great pyramid. Its height is given as 487½ feet.—FOGY.

53. BLACKBOARD.—The following is a good recipe: One quart of shellac dissolved in alcohol, 3 ounces of pulverized pumice stone, 2 ounces of pulverized rottenstone, and 4 ounces of lampblack; mix the last three ingredients together, moisten a portion at a time with a little of the shellac and alcohol, grind as thoroughly as possible with a knife or spatula, after which pour in the remainder of the alcohol, stirring often to prevent settling. One quart will furnish two coats for 80 square feet of blackboard not previously painted. The preparation dries immediately, and the board may be used within an hour if necessary.—DOMINIE.

54. PAINT.—There is but one paint suitable for floors, *French ochre*. First, if the boards have shrunk, clean out the joints well, and, with a small brush, give them a heavy coat of boiled linseed oil, then putty up solid. Now paint the whole floor with a mixture of much oil and little ochre, for the first coat, then, after it is well dried, give two more coats of much ochre and little oil, finally finish with a coat of first-rate copal varnish. This is an extremely durable paint for floors, indoors or out, such as verandas, porticos, and the like. A floor stain is best mixed with oil, and finally varnished.—DAUBER.

55. FIRE—Wood can be made incombustible by tungstate of soda. It has been demonstrated by experiments, that wood immersed in a "pickle" of a solution of tungstate of soda cannot be ignited under any of the ordinary conditions to which it may be exposed. The tungstate is made by the addition of tungstate of lime to sulphuric acid and salt, affording us a by-product, chloride of calcium, in large quantities. The action of the tungstate upon soft woods is to render them quite hard as well as incombustible, and it also acts as a preventive against dry rot. Sticks and boards of the prepared wood have been saturated with kerosene oil and set on fire; the oil burned off entirely without igniting the wood. Two small houses have been built, one of ordinary pine wood, the other of the prepared wood, and fires of great urgency kindled in each. The one of ordinary wood was quickly consumed, while the other was left only slightly charred.—PLUTO.

56. WOOD.—Wet and dry rots are the two forms of decay which attack timber that is exposed to the action of the weather, and the cause of both may be said to be heat with moisture. Confined air and evaporation cause dry rot, and imperfect evaporation wet rot, to a greater or less degree. Investigation shows that as a preventive against these rots the timber should be well seasoned, and if used where liable to be under the influence of sun and rain should be well painted, or if not painted should be impregnated with linseed oil or tar. The best preventive, however, is found to be that of allowing a free circulation of air around the timbers, and the walls to be allowed to dry thoroughly before the introduction of the timbers; should the timbers have taken either of these rots very little can be done to preserve them.—WEST POINT.

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THE complete clearing out of our "Detail Sheets" has encouraged us to offer the following packages of valuable drawings for sale, at the extremely low price of one dollar a package.

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Package No. 3 contains 39 elevations and plans for cottages, villas and dwellings; 10 elevations and plans for churches; and 146 designs for brick and stone work, shipwork, half-timbered work, verandas, drawing lessons, windows, doors, etc., etc.; also 26 designs of cornices, panels, etc., for plasterers. Price $1.

Package No. 4 contains 51 plans and elevations for cottages, villas, barns, stables, and railway stations; also, 5 plans and elevations of churches; and 115 detail drawings of scroll-work, windows, bay-windows, gables, verandas, side finish, newel-posts, shipwork, general house details, bay-window frames, frieze cornices, balustrades, oriel window, fences, gates, vestibule and front door, open timber roofs, etc., etc. Price $1.

Package No. 5 contains 72 elevations and plans of cottages, city houses, banks, villas, and country houses; also plan and elevation of schoolhouse, and 125 detail drawings of desks, counters, doors, door finish, piazzas, gables, dormers, wainscoting, chimney-cases, ceilings, front gables, porches, verandas, timber roofs, crestings, towers, vanes, stairs, mantels, balusters, newels, grilles, cornices, gateways, railing, etc., etc. This is an excellent package. Price $1.

Package No. 6 contains 38 plans and elevations of cottages, villas, and country houses; 3 plans and elevations of churches; and 155 detail drawings of fences, doors, windows, stairs, mantels, verandas, porches, stoops, carved work, gates, summer-house, newel-posts, balusters, wrought-iron work, chimney-tops, gables, examples of furniture, finials, bay-windows, dormers, hoods, arches, oriels, truncated gables, turned work, cornices, church furniture, counters, etc., etc.

Besides the above illustrative and necessary descriptive and explanatory matter, this package contains a series of illustrated papers on the use of the steel square. This package is an excellent one for carpenters and joiners who do work in the country towns, as the details are numerous and easily understood. Price $1.

Package No. 7 contains 44 plans and elevations of cottages and villas; 164 detail drawings of roofs, mantels, windows, doors, balconies, verandas, stairs, newels, piazzas, vanes, dormers, pews, church finish, chimneys, brickwork, porches, cornices, pinnacles, brick arches, etc., etc. There are also five plans and

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elevations of churches, with all the necessary details drawn to scale; also, a railway depot, plans, elevations, and details.

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N.B.—We wish it distinctly understood that all the above matter was published in the AMERICAN BUILDER during the years 1874, 1875, 1876, 1877, and 1878; therefore parties having copies of the BUILDER for those years will have no use for any of these packages.

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The following Contents for August number will give a general idea of the character of the Journal:

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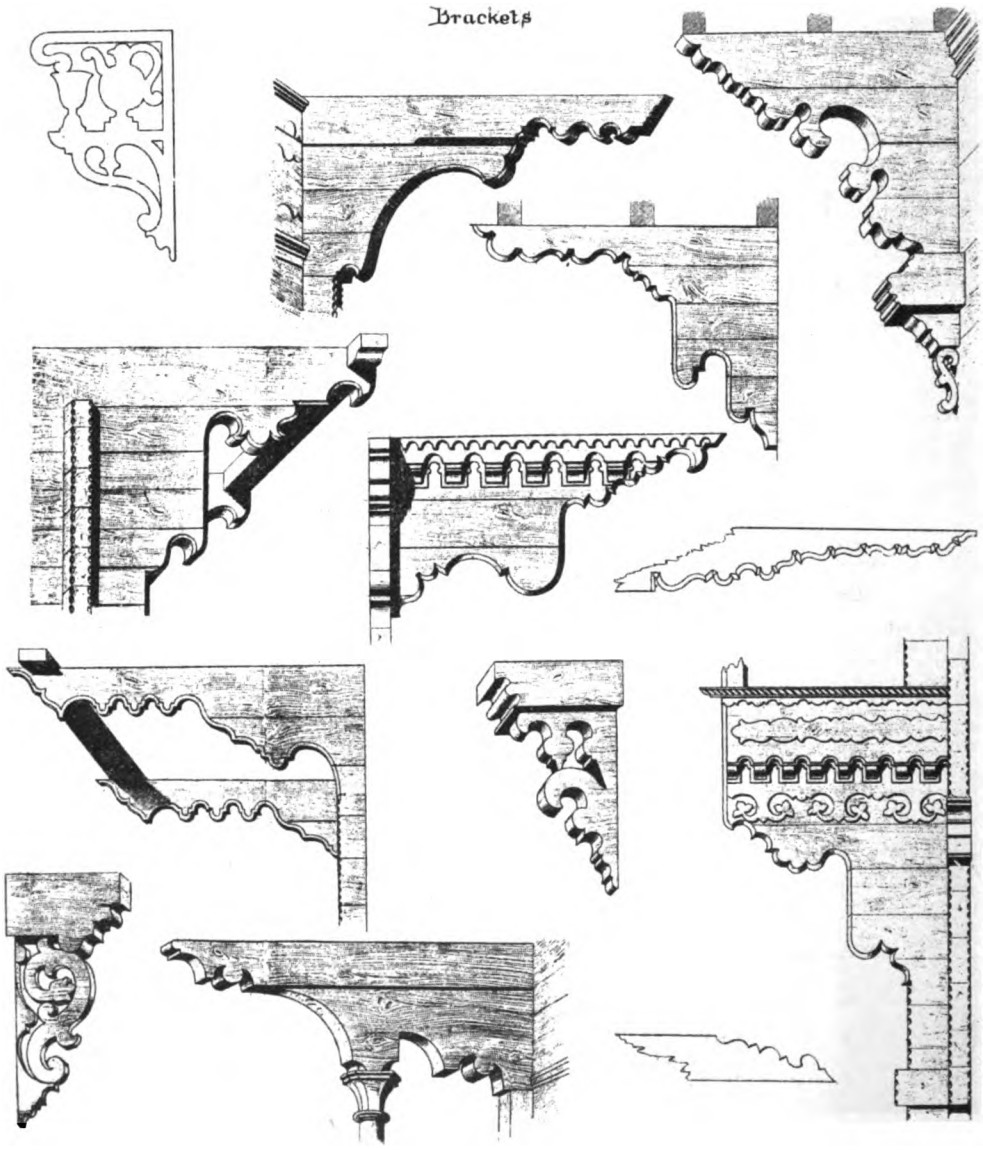
PLATE 72



EXAMPLES OF SWISS ARCHITECTURE.

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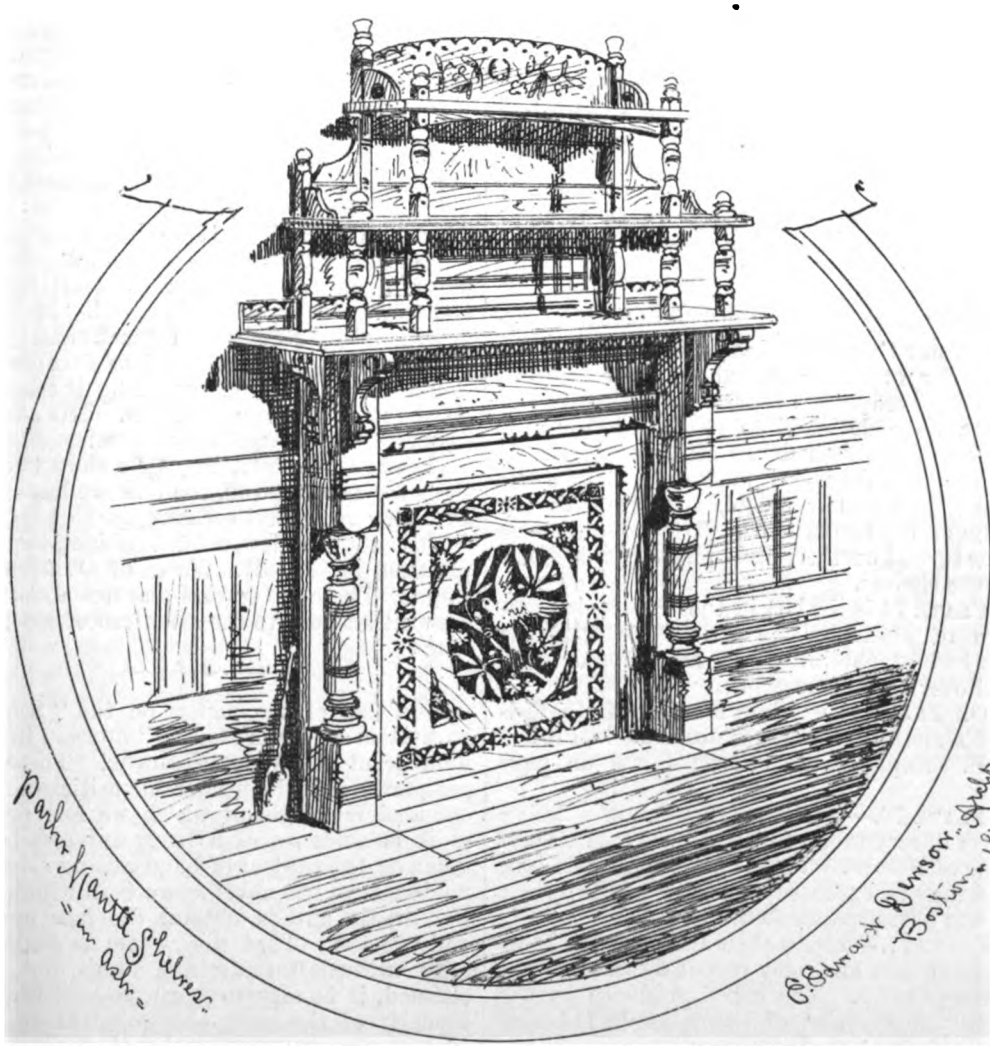
THE ILLUSTRATED WOOD WORKER

FOR JOINERS CABINET MAKERS STAIR BUILDERS CARPENTERS CAR BUILDERS &c. &c.

VOL. No. 10 OCTOBER, 1879. PRICE TEN CENTS



MANTEL.

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ILLUSTRATIONS.

Mantel and Shelves; Hand-railing; Lessons in Projection; Library Table; Sitting-room Mantel; Examples of Swiss Architecture; Pedestal; Newels; Cabinet.

Our Illustrations.

ON our title-page this month we show designs for a mantel and shelves. The drawing was prepared by Mr. Dewson, of Boston. The shelves are designed to be executed in ash, oiled and finished dry. The ornamentation of the back is incised work, and may be finished in black or colors, according to the taste of the constructor. The columns have pins turned on their ends which fit into holes in the shelves.

PLATE 74 is the last in the "Sectorian system of Hand-Railing;" it illustrates the method of obtaining the face mould for a rail over an elliptical plan.

On PLATE 75 we show another of Mr. Riddell's methods of solving problems in Projection. Explanations will be found on page 150.

PLATE 76.—On this plate we show a design for a library table, furnished us by Mr. Dewson, of Boston. This is an excellent design, and may be executed in native woods by any of our advanced amateurs.

PLATE 77.—This plate is also from Mr. Dewson's studio, and may be put down as rather a nice design. The effect produced by the peculiar treatment of the pilasters is rather curious, but not altogether displeasing.

On PLATE 78 we show a number of examples of Swiss architecture and furniture. Figs. 1, 3, and 4 are examples of tables; 3 and 4 can be made by any amateur who possesses a little patience and a fair knowledge of the use of tools. Figs. 2 and 8 are good examples of rustic and veranda chairs; the method of preparing and putting together is obvious. Figs. 5, 6, 7, and 10 show examples of benches and seats of various kinds suitable for summer houses, gardens, stoops, etc. Fig. 9 is a window hood with ornamental side jambs. Fig. 11 exhibits a novel but substantial way of making a very useful and necessary article of furniture—a cradle. There is nothing mechanically difficult in the construction of any of the articles shown on this plate, excepting the table, Fig. 1, the legs and framework of which are splayed; and splayed lines are troublesome to work after, even to the finished workman; still a patient and ardent amateur ought not to be afraid to tackle it if the design suits him in other respects. The beginner will find Figs. 5 and 7 excellent things to practice on, and we shall be pleased to correspond and answer such questions as may be asked us regarding these or any of the other designs shown on this plate; either as to material, size, proportion, dimensions of materials, method of making, etc.

On PLATE 79, Fig. 1, we show a design for a pedestal. This was prepared, at the request of one of our correspondents, by Mr. George W. Rich, of Quincy, Ill. It is designed to be finished in black and gold. Mr. Rich has kindly offered to furnish particulars to any person regarding the designs he sends us for reproduction. His address may be found in another column.

On the same plate, Fig 2, we show two designs for newel posts, such as we have been asked for on several occasions.

PLATE 80 is a design for a cabinet, and was prepared by A. M. West, of Waterbury, Conn. There are several features about this design that deserve the attention of art amateurs.

THE last of the papers on the "Sectorian System of Hand-Railing" appears in this number of the WOOD-WORKER. These papers have elicited considerable criticism from our readers—a fact of which we feel proud, as it is evidence of a lively interest being taken on the subject of hand-railing—owing, no doubt, to the novel manner in which Mr. Forbes, the author, obtains the face moulds and wreaths. That the system is faulty its most enthusiastic admirers admit, but, it is claimed, it is easy to learn, and within the capacity of the most obtuse workman, and possesses some peculiarities that even the

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most scientific stairbuilder could make use of at times to advantage. To the workman whose time is limited, and who does not feel able to grapple with the more scientific but more reliable systems of Riddell, this system will recommend itself simply as an *expedient;* but to the ambitious young workman who desires to be at the head of his vocation, a study of this system would be simply a waste of time which could be more profitably employed in acquiring a thorough knowledge of the system as taught by Mr. Riddell.

THE retail price of the "Sectorian System of Hand-Railing," in book form, is five dollars per copy, and it cannot be obtained for less. Yet we have given the work complete, including all the diagrams and illustrations, with notes and explanations not found in the original work, besides a large amount of other interesting and useful matter, for less than one dollar. If this is not giving the workman useful information at small cost, we should like to know in what small cost consists.

MR. RIDDELL'S papers on Projection end with the one in the present number. We are sure many of our young readers have profited by these papers, and will, no doubt, wish they had been extended, as they have been so clear and so easily understood. Clearness and simplicity, combined with an adaptation to the wants and capabilities of the workman, are characteristic of all Mr. Riddell's works, and it is to these qualities that their popularity among English-speaking carpenters and joiners is due.

THE sale of our "Drawings for the Million" has been so great that we have completely run out of "Package No. 1." We can supply several hundred sets, however, from "Package 2" to "Package 11" inclusive, but as these are going rapidly it will be advisable for those requiring them to send in their orders without delay, as some of the numbers may be exhausted during the present month, and a like opportunity of acquiring so much useful matter for so small a sum may not occur again in a life-time.

THE good time coming has come when revived prosperity reaches the day laborers. This is the case now generally throughout the country. It is estimated, a contemporary says, that in the city of Philadelphia alone there are fully 20,000 more people employed at this date than there were on the first of September last year. Every business, it is asserted, with scarcely an exception, is feeling the effects of the trade revival, and according to present prospects there is in store for both employers and employees a tide of prosperity such as has not been experienced for many a long year. There is quite an active demand for workmen in iron and machinery works, and many shops are now running over time in order to be on time with contracts, and in several instances the supply of workmen is unequal to the requirements of the shop. The revival, to a limited extent, has also reached the building trades, but its full force will not likely be felt until the opening of the season of 1880, though, from information before us, it is evident that many contracts will be given out this fall; and should the winter be a mild one the times will be rather lively in some of the building trades, particularly in that in which carpenters and joiners are most interested.

WE have received a number of articles on the "Steel Square" by Mr. E. Hill, of Terre Haute, Ind., which we intend to publish in a short time. Anything original on the use of the steel square is sure to meet with a hearty welcome by all who have to use that tool.

To turn oak black so as to cause it to resemble ebony, the wood should be immersed for forty-eight hours in a hot saturated solution of alum, and then brushed over several times with a logwood decoction, prepared as follows: Boil one part of best logwood with ten parts of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one half. To every quart of this add from ten to fifteen drops of a saturated solution of indigo, completely neutral. After applying this dye to the wood, rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. To imitate rosewood, a concentrated solution of hypermanganate of potassa is spread on the surface of the wood and allowed to act until the desired shade is obtained. Five minutes suffice ordinarily to give a deep color. A few trials will indicate the proper proportions. The hypermanganate of potassa is decomposed by the vegetable fibres with the precipitation of brown peroxide of manganese, which the influence of the potassa, at the same time set free, fixes in a durable manner on the fibres. When the action is terminated, the wood is carefully washed with water, dried, and then oiled and polished in the usual manner. The effect produced by this process on several woods is remarkable. On the cherry especially it gives a beautiful red color.

A WRITER in the *Atlantic Monthly* says: I believe that for most men more than eight hours' work per day is required for the maintenance of physical, mental, and moral

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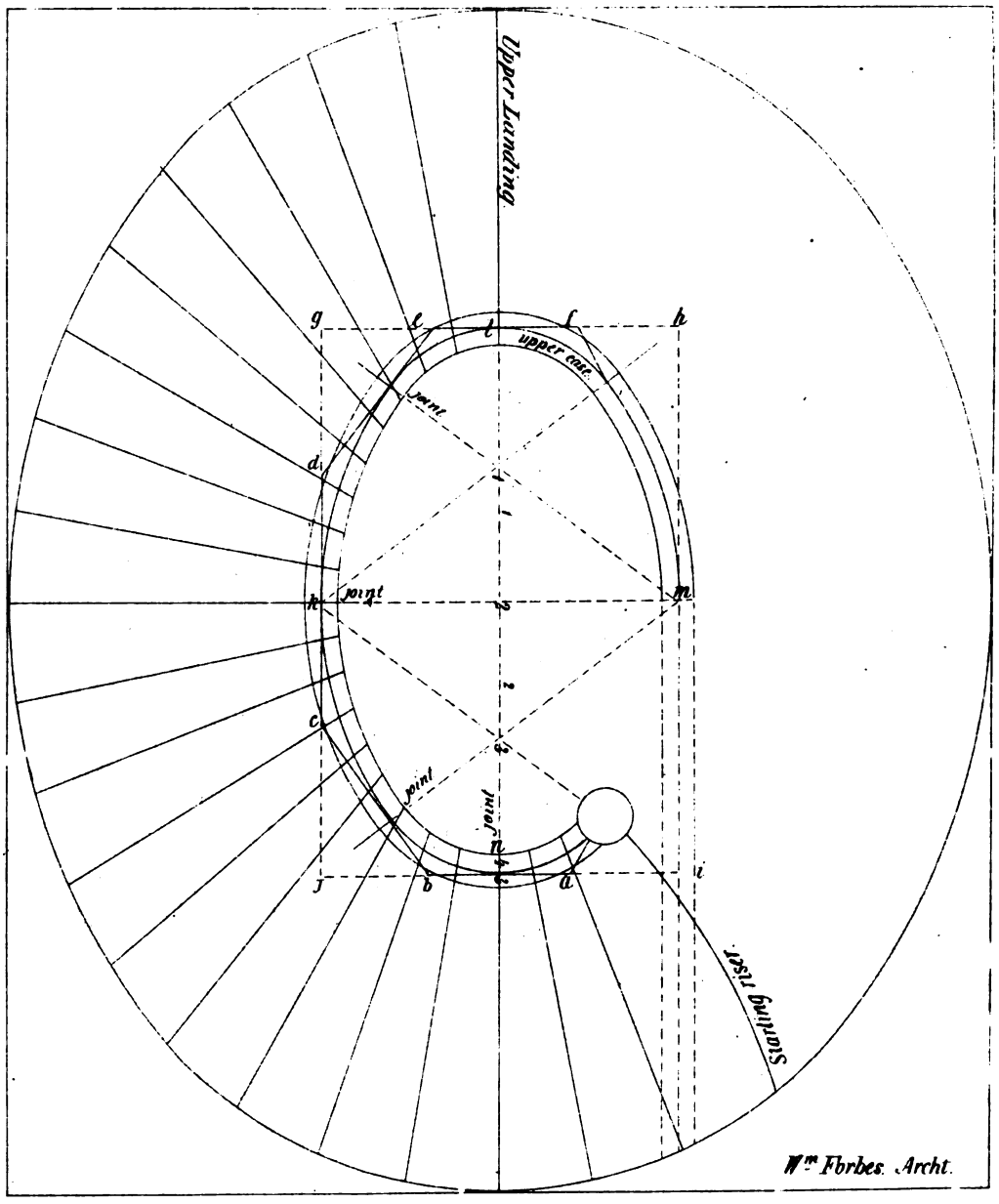
PLATE 74



THE SECTORIAN SYSTEM OF HAND-RAILING.

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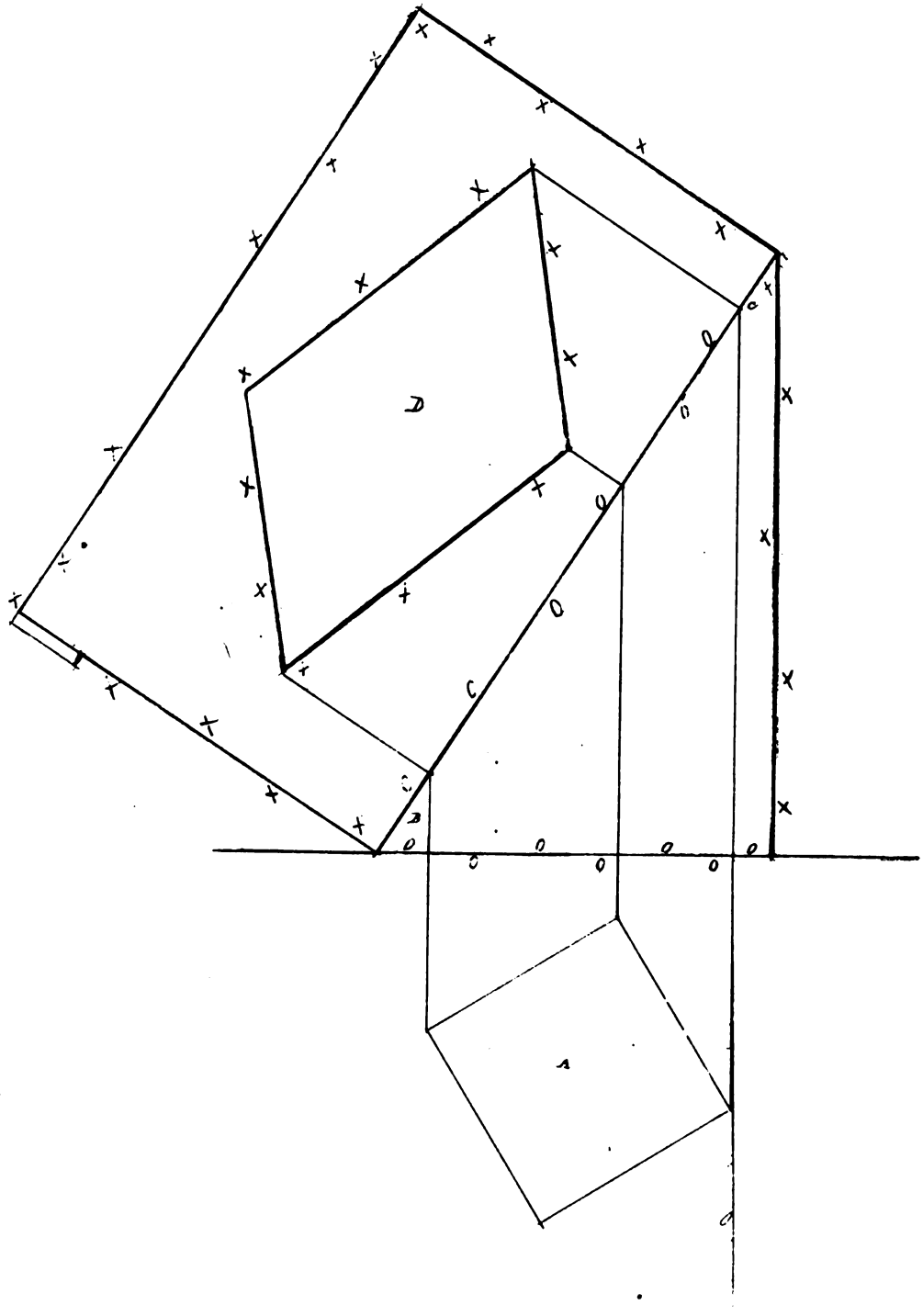
PLATE 75



LESSONS IN PROJECTION BY ROBERT RIDDELL, ESQ.

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health. I think that for most men, including operatives, mechanics, farmers, and clergymen, more than eight hours' labor per day is necessary, in order to keep down and utilize the forces of the animal nature and passions. I believe that if improvements in machinery should discharge men from the necessity of laboring more than six hours a day, society would rot in measureless and fatal animalism. I have worked more than ten hours per day during most of my life, and believe it is best for us all to be compelled to work. It would be well, I think, if we could make it impossible for an idler to live on the face of the earth. Religious teachers are not without responsibility for having taught that the necessity of labor is a curse. The world owes most of its growth hitherto to men who tried to do as much work as they could. Its debt is small to the men who wished to do as little as possible.

A NEW furniture wood is rapidly coming into favor with the London cabinet-makers; it is called "bass wood," and is exported from this country. It is said to be very plentiful in Canada. This wood is largely used by cabinet-makers here for painted bedroom suites, and also for sides and bottoms of drawers in ordinary furniture. Basswood is very cheap and easy to work, and affords a base for veneering upon. It also takes stain well. The only drawback is its softness; but makers of cheap ebonized cabinets are already using it largely.

THE furniture in the La Pierre Hotel, Philadelphia, has been sold at auction for $20,000, which sum is far below its value. The tenant demanded repairs that the owners would not make, and the former summarily determined to close. This was the first hotel in this country to put up prices above $2 a day, and used to be very fashionable. The Centennial Exhibition caused a brisk season in the Philadelphia hotel business; but the reaction has closed the American and West End, besides the houses that were built especially for that season.

The Sectorian System of Hand-Railing.

TENTH PAPER.

Plate 74.

AN elliptic stairs is exhibited on this plate, and one differing in some respects from any I have ever seen. The well-hole is two-thirds the width of its length, and all the lines drawn within itself, and no line but the true segment of a circle used. It will be observed that the length is divided into four equal parts, and again into three, two of which are given to the width; then the points *k*, *l*, *m*, *n* are used, from which to describe the segments for the different sections of wreath. The joints are made as laid down, square, with tangents and face of plank. Be sure the plank has a true face to work from, to insure a good job. *a*, *b*, *c*, *d* are the angles of the tangents, from which, by the use of the sector, the bevels are obtained on the rake for describing wreath pieces. The tangents with their angles *b* and *c* being respectively of the same length with *d*, *e*, the same mould will answer for both, by reversing. The full size required for a stair of this pattern for a building of moderate size would be seven by thirteen feet, and could be very neatly placed in a recess made for the purpose. *g*, *h*, *i*, *j* show the angles of the area of well-hole. The dotted lines show the continuation of level rail on floor above.

This example has twenty-two risers, which, at seven inches each, would be twelve feet ten inches from floor to floor, and a very ample pitch for the ceiling of the hall.

All the work necessary to complete this example and all the preceding ones, the author flatters himself, has been given to make it an acceptable offering to those for whom it is intended.

The above completes the series of papers on the "Sectorian System of Hand-Railing," and we hope those readers who are interested in the subject have appreciated them.

Lessons in Projection.

BY ROBERT RIDDELL, TEACHER OF THE ARTISAN CLASS IN THE HIGH SCHOOL, PHILADELPHIA.

Plate 75.

IF a square prism, as *A*, Plate 75, be projected and cut by a plane as *B C*, then the section forms the parallelogram *D*. This is proved by raising the cut parts *x x x x*, and folding at *o o o*. This done, it will be seen that the projected sides of the figure stand or range directly over those of the base *A*.

This paper completes the series of lessons on Projection as first designed.

Correspondence.

WE invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of the Wood-Worker:

YOUR publication is deserving of lasting success, and I consider it the duty of all lovers of art in wood to lend it their assistance. I shall be pleased to do all I can for the WOOD-WORKER in my humble way, and hope others may do the same. I would like to see

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the paper published every two weeks if it were possible. I send you for publication a design for a "pedestal" in answer to "Amateur," and trust it answers his purposes. I shall be pleased to contribute occasionally for the benefit of those asking for special designs, and will furnish particulars to any one who will address me concerning the designs I furnish. GEO. W. RICH.

QUINCY, ILL.

[We publish the above letter—though it was not intended for publication—in the hope that others of our Western friends will take a like interest in the WOOD-WORKER. There is an abundance of talent in the West hiding its light, and we earnestly invite it to come forward and take part in creating a higher state of culture in the various arts of wood-working we represent. We shall at all times be pleased to welcome in our columns any design of merit, be it simple, plain, or elaborate.

We are sure our readers will appreciate—as we do—the liberal offer made by Mr. Rich, to furnish particulars, and no doubt many will avail themselves of the offer.—ED.]

Editor of the Wood-Worker:

IN the January number of the WOOD-WORKER you make mention of your intention of publishing a number of designs for interior and exterior finish in that journal; but up to the present none have appeared. Will you publish such in the future? I would like to see a few designs for the finish of inside doors and windows, the work to be so arranged that it can be got out by hand, and in all cases a scale should accompany the design, for a drawing without a scale is of little use to a workman.

GRIDLEY, CAL. E. EHRENFELD.

[Our correspondent has not paid much attention to the illustrations, or he would have seen that we have more than filled our promises to our reader, and if he will examine Plates 1, 4, 11, 13, 16, 29, 40, 44, 45, 52, 53, and 80, he will see at once that we have been mindful of our promise. We endeavor to fill the wants of all our readers, and shall always be pleased to hear from them when they have any complaint to make, and will tax our energies to the utmost to satisfy their requirements.—ED.]

Editor of the Wood-Worker:

I HAVE not met with anything in my experience in mechanical literature that meets with my ideas of a trade journal so well as the WOOD-WORKER does. It is just the thing for the advanced workman, and at the same time the papers on "Hand-Railing," "Projection," and "Carpentry," are suitable for the younger ones, and in a majority of cases are useful to old hands. The amateur, too, can find something in each number that will amply repay him for the trifling cost of the paper. Indeed, the paper should be in every house, as it would have a tendency to teach boys how to make many things useful and ornamental from wood, and would have great influence in instilling industrious habits in them which would have a favorable effect on their future lives. A series of papers on perspective drawing would, I think, be of interest to some of your readers, and would be duly appreciated by a—STUDENT.

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

74. WINDOW GARDEN.—If some of your contributors will publish one or more designs for a window garden of one and two tiers of boxes, they will greatly oblige.—ROBERT P. WAKEMAN.

75. FRUIT AND CIGAR STAND.—Will some of our generous contributors, say F. T. Camp or Mr. Fieder, furnish a design for an ornamental "Fruit and Cigar Stand?" The ground plan to be, say, about 12 x 14 feet; the whole to be finished in wood.—F. J. STIRMAN.

76. PEDESTAL.—I would like very much if you would publish a design for a pedestal, such as an amateur could make. I would also like to see a few designs for window cornices; something simple and easy to make. Mr. Fieder's designs I think are very simple, easily executed, and withal artistic.—H. P. RUSSELL.

77. SPRING AND PLUMB BEVEL.—I should like to see an answer to the question asked by Apprentice, in query 25. I do not understand how to obtain the bevels as described in the papers on the Sectorian System of Hand-Railing, and I think many others are in the same fix as myself and Apprentice. Will Mr. Forbes please rise and explain, and oblige?—M. C. H.

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PLATE 76

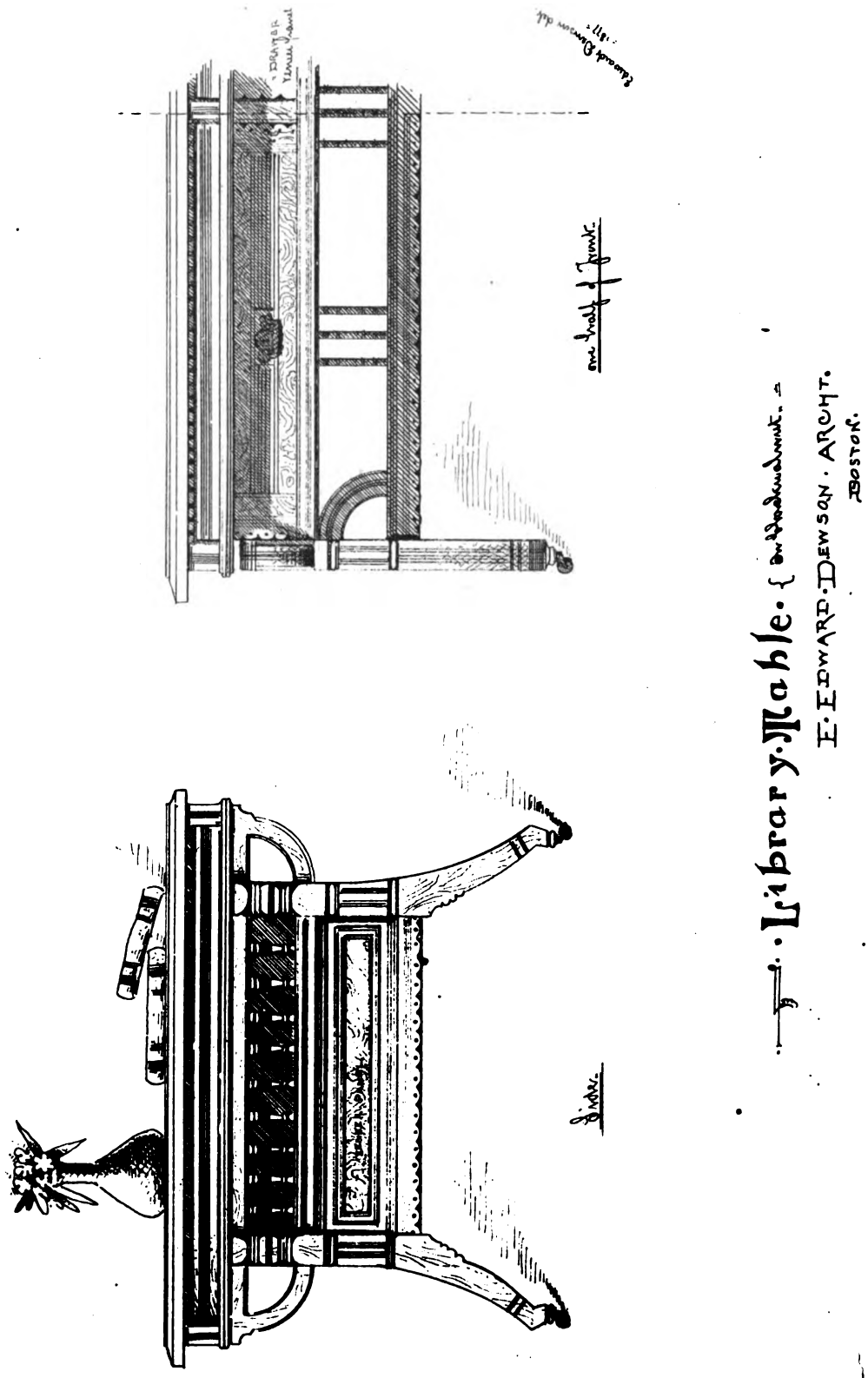

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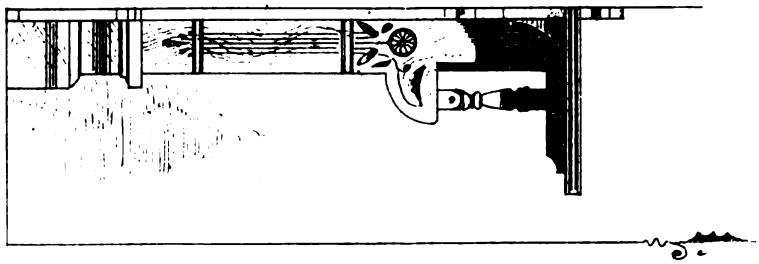
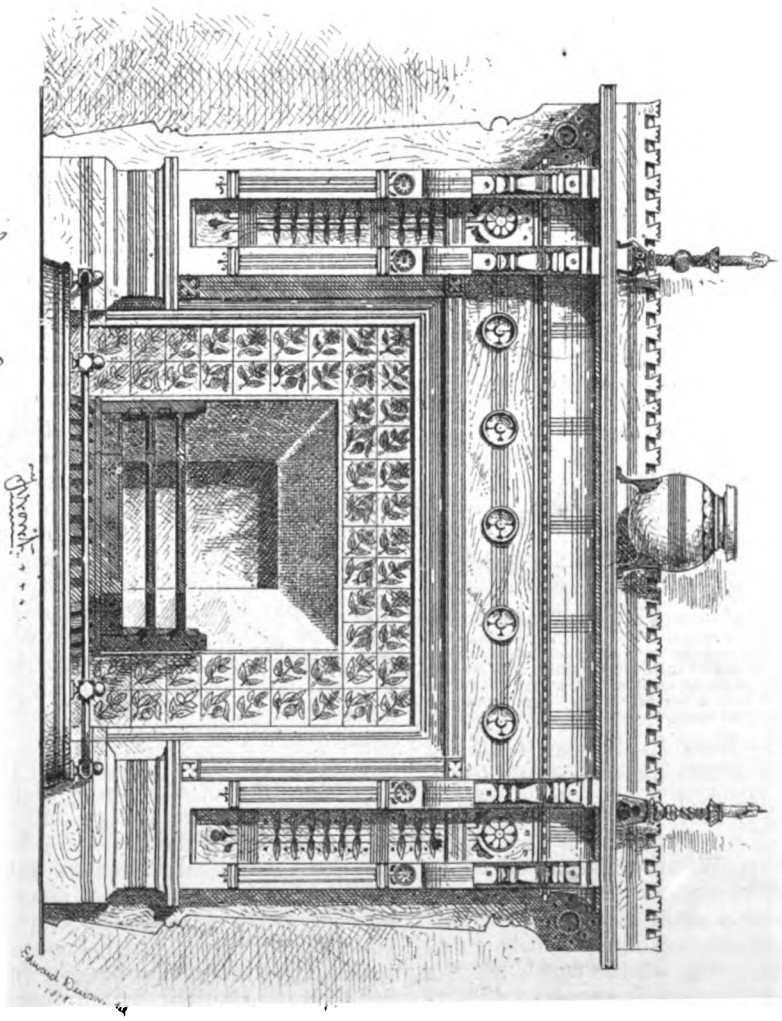
PLATE 77

E. EDWARD DEWSON, Architect.





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78. DIMENSIONS.—Will Mr. Kuhns be kind enough to give, though your paper, a little more information with regard to the design and plans of the handsome cottage shown on Plate 13, current volume of the WOOD-WORKER? As there are no dimensions given on the plan nor scale, it is somewhat difficult to arrive at correct sizes of rooms, etc. A few of the important dimensions, such as sizes of rooms and height of stories, will greatly benefit a—NOVICE.

79. GEOMETRY.—Will some reader please inform me what works in geometry are the most suitable for an aspiring builder to study without a teacher?—STUDENT.

80. DRAFTING INSTRUMENTS.—I would like to know what make of drawing instruments is the best to get for a young man of small means, who is just beginning to learn how to draw; also, please give price, and where they can be obtained.—STUDENT.

81. POLISHING.—How can I properly prepare hard wood, or wood that is stained, for polishing? The information will oblige.—TYRO.

82. STAINED WORK.—Will some one inform me how stained work may be freshened up, describing the manner, etc.—TYRO.

83. BLACK AND GOLD FRAMES.—How is the black put on gold and other picture frames?—YOURS TRULY.

84. TABLE.—I should be much pleased to see drawings in the WOOD-WORKER of the extension parts of a dining-table. I would feel obliged if the drawings were made to scale so that they could be worked from.—TINE.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

35. PLOUGH.—John R. D. can obtain a Phillips Plough Plane by addressing Chas. Babson, Jr., No. 30 Kilby St., Boston, Mass.—STUDENT.

57. EMBOSSING WOOD.—The wood to be ornamented is first worked out to its proposed shape; then with a blunt steel tool, the pattern is made, by driving it cautiously so as not to break the grain of the wood, till the depth of the depression is equal to the intended prominence of the figures. The ground is then reduced by planing or filing to the level of the depressed part. After which the wood being placed in water, the part depressed will rise to its former height, and thus form an embossed pattern. Another process is to use metallic dies, which are made red-hot, and then pressed on the wood. The pattern being thus burnt in, the chased portions are brushed out, and the design finished by hand.—ARTIST.

58. SPANDRIL.—This is an irregular triangular space formed between the outer curve or extrados of an arch; a horizontal line from its apex and a perpendicular line from its springing; also a space on a wall between the outer mouldings of the two arches, and a horizontal line or string-course above them; likewise between similar mouldings and the line of another arch rising above and enclosing the two.—E. D. SAWIN.

59. RUBBER.—Caoutchouc and gutta-percha are both quite soluble in naphtha, benzole and carbon disulphide. The latter, when mixed with about 6% of absolute alcohol is one of the best solvents. The solution is performed in the cold (best in the open air), as it would not be safe or economical to heat these volatile and inflammable liquids. Exposed to the air the solutions soon evaporate, leaving the gums in their original condition.—ELASTIC.

60. CHAIRS.—Chairs were not articles of general use in England till the reign of Queen Elizabeth. Pugin, in his "Designs for Gothic Furniture," says that a good chair should "give ease to the body and have strength to support it," and at the same time be light, so that it may be easily moved. A recent number of *Nature* contains an article on "Easy Chairs." After noticing the different attitudes of different races, such as the Hindoo, who sits on the ground with his knees up to his chin; the Turk, who squats cross-legged; the European who poses on a chair; the American, who lolls with his feet raised above his head, the writer sums up the modes of getting rest from muscular fatigue as follows: "For an easy chair to be perfect it ought not only to provide for complete relaxation of the muscles, for flexion and consequent laxity of the joints, but also for the easy return of blood and lymph; not merely by the posture of the limbs themselves, but by equable support and pressure against as great a surface of the limbs as possible. Such are the theoretical demands, and these are fulfilled by the bamboo easy chairs manufactured in India, made in the shape of a straggling W, which the languor consequent upon a relaxing climate has taught the natives of India to make, and which the rest of the world appreciates."—COSEY.

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61. PICTURE FRAMES.—A framed picture, however small, should never be suspended on one nail. This may seem a trifle; but, independently of the considerations of safety, the effect produced by two points of support is infinitely better. The triangular space enclosed by a picture-cord stretched between three points must always be inharmonious with the horizontal and vertical lines of a room.—WILLIE.

62. ÆOLIAN HARP.—The invention of the Æolian harp is ascribed to Achanasius Kircher. The tones of the harp are produced by the sweeping of the wind over its strings. The Æolian harp is constructed in the following manner: Take a rectangular box made of very thin boards, about five inches deep and six inches wide; have it long enough to fit across the window in which it is to be placed. At the top of each end of the box glue a strip of wood about half an inch in height; these strips will serve as a bridge for the strings, which are to be stretched lengthwise across the top of the box, and are made of catgut or wire. These strings should be tuned in unison by means of pegs constructed to control their tension as in the violin. When the instrument is exposed in a window partly opened so as to allow a current of air to pass over the strings, a most agreeable combination of tone is produced, which vary with the force of the wind, producing harmonies of a wild and melancholy character. Achanasius Kircher was not a Yankee, but a—GRECIAN.

64. TEST.—One volume caustic soda, specific gravity 1·340, mixed with five volumes of linseed oil, well shaken and heated to the boiling point. If pure, the oil will assume a bright yellow color and remain pure.

According to the foreign pharmaceutical journals, linseed oil is now frequently adulterated with cod liver oil. To detect this adulteration, 10 parts by weight of the oil is mixed with three parts by weight of commercial nitric acid in a glass cylinder, and well mixed by stirring with a glass rod. It is then left quiet until the oil and acid separate. If cod liver oil is present, the layer of oil will have a dark brown or black color, and the acid will be orange yellow or yellowish brown. Pure oil treated in the above way is at first a water green, then a dirty yellowish green, and the acid takes on a brighter yellow color.—A. W. TEST.

65. ROSEWOOD.—Take two parts logwood chips, one part extract of logwood, steep in water, using a copper kettle for the purpose. Apply while hot, taking care to have the wood clean and free from grease. When dry, go over it lightly with fine sand-paper. Then apply a solution of vinegar that has had a quantity of nails standing in it for several days. The vinegar is applied with a brush made of rattan that has been hammered on the end until its fibres form a brush. It is this brush that gives the work a granular appearance. If the first coat is too red, use more extract until the proper shade is obtained.—E. A. WHEELER.

65. ROSEWOOD.—1. A transparent liquid rose-pink, used in imitating rosewood, consists in mixing ¼ pound of potash in 1 gallon of hot water, and ¼ pound of red sanders wood is added thereto; when the color of the wood is extracted, 2½ pounds of gum shellac are added and dissolved over a quick fire; the mixture is then ready to be used on a groundwork made with logwood stain. 2. Boil ½ pound of logwood in 3 pints of water till it is of a very dark red, add ¼ ounce of salts of tartar. While boiling hot, stain the wood with two or three coats, taking care that it is nearly dry between each; then with a stiff flat brush, such as is used by the painter for graining, form streaks with black stain. This imitation will very nearly equal the appearance of dark rosewood. 3. Stain with the black stain, and when dry, with a brush as above dipped in the brightening liquid, form red veins in imitation of the grain of rosewood. A handy brush for the purpose may be made out of a flat brush, such as is used for varnishing; cut the sharp points off, and make the edges irregular by cutting out a few hairs here and there, and you will have a tool which will actually imitate the grain.—JUPITER.

66. CARVINGS.—Take a piece of wadding, soft and pliable, and drop a few drops of white or transparent polish, according to the color of the wood. Wrap the wetted wadding up in a piece of old linen, forming it into a pad; hold the pad by the surplus linen; touch the pad with one or two drops of linseed oil. Pass the pad gently over the parts to be polished, working it round in small circles, occasionally re-wetting the wadding in polish, and the pad with a drop or so of oil. The object of the oil is merely to cause the pad to run over the wood easily without sticking, therefore as little as possible should be used, as it tends to deaden the polish to a certain extent. Where a carving is to be polished after having been varnished, the same process is necessary, but it can only be applied to the plainer portions of the work. Plain surfaces must be made perfectly smooth with sand-paper before polishing, as every scratch or mark will show twice as badly after the operation. When the polish is first rubbed on the wood, it is called the bodying in; it will sink into the wood and not give much glaze. It must when dry have another body rubbed on, and a third

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PLATE 78

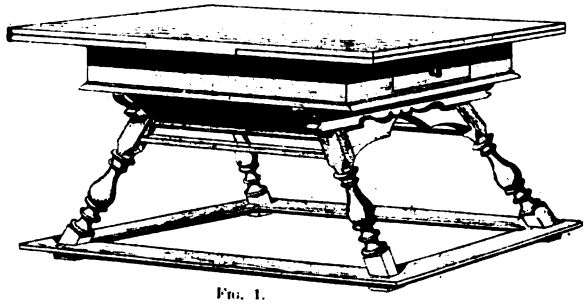


FIG. 1.

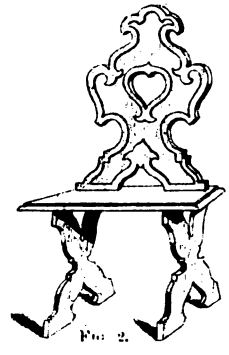


FIG. 2.

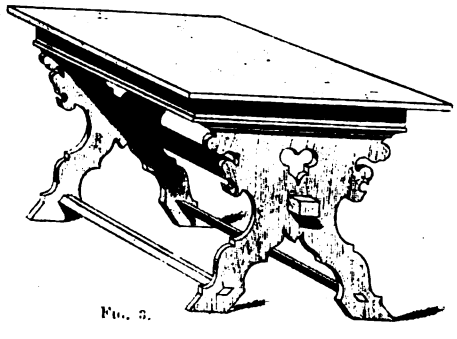


FIG. 3.

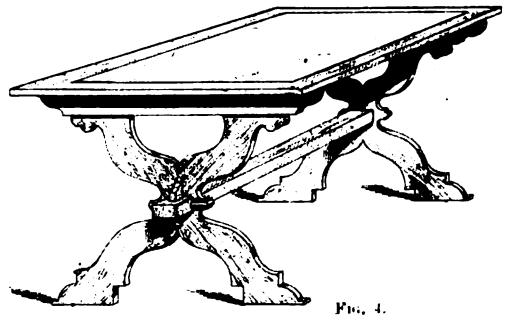
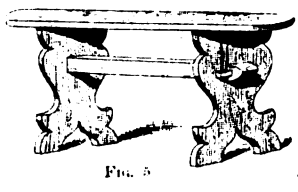


FIG. 4.



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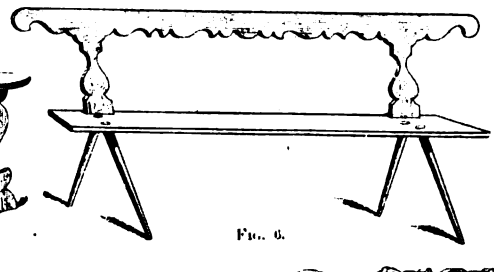

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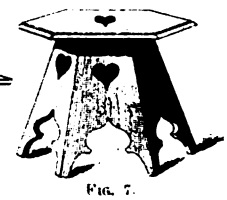

FIG. 7.

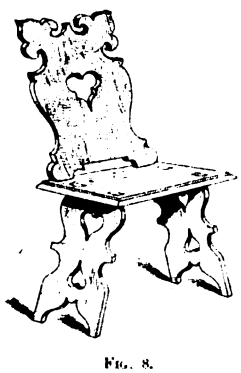

FIG. 8.

FIG. 9.

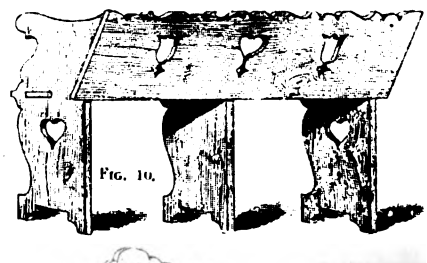

FIG. 10.

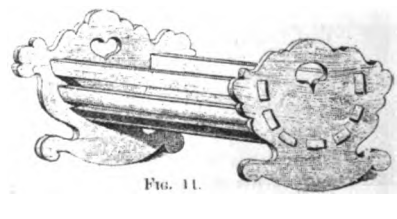

FIG. 11.

EXAMPLES OF SWISS ARCHITECTURE.

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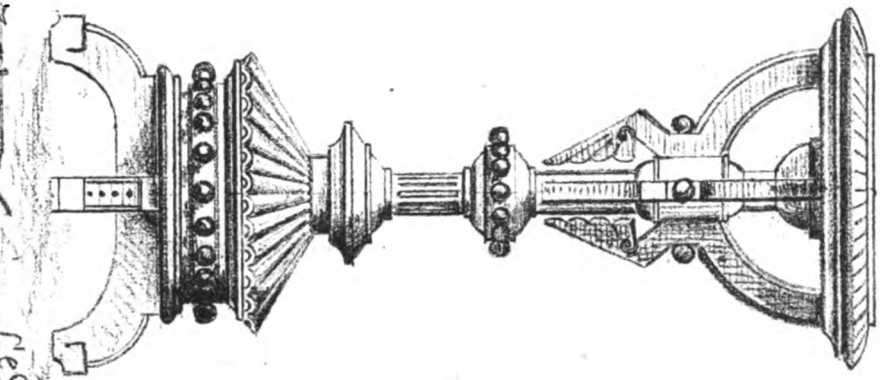
PLATE 79

Newels.

Fig. 1.



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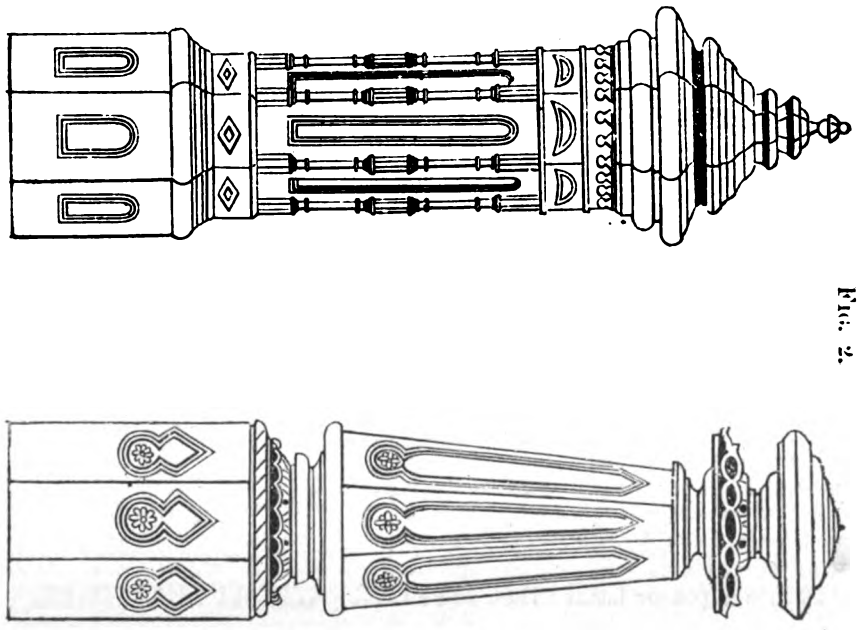

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generally finishes it; but if not the operation must be repeated. Just before the task is completed greasy smears will show themselves; these will disappear by continuing the gentle rubbing without oiling the pad.—AKER.

67. DECORATION.—You will find it rather a difficult piece of work to decorate your flower-pots with decalcomanie, because the pots are porous, and the water and damp soaking through will eat everything off. It can be done with a solution of milk, glue, and the required colors, but the better way is to get the pots or jars that have been glazed or baked; having this ground to work on, it can be easily accomplished as follows: Take for a background lampblack and turps, coat the pot over, then you have a dead black (it may be necessary to give the pot three or four coats); now put on decalcomanie and when dry varnish with demar varnish. Never use oils of any kind.—HUB.

68. MORTISE AND TENON.—The following rules may be referred to as *data* for the workman in ordinary practice:

The tenon, in general, may be taken at about one-third of the thickness of the wood.

When the mortise and tenon are to lie horizontally, as the juncture will thus be unsupported, the tenon should not be more than one-fifth of the thickness of the stuff, in order than the strain on the upper surface of the tenoned piece may not split off the undercheek of the mortise.

When the piece that is tenoned is not to pass the end of the mortised piece, the tenon should be reduced one-third or one-fourth of its breadth, to prevent the necessity of opening one side of the tenon. As there is always some danger of splitting the end of the piece in which the mortise is made, the end beyond the mortise should, as often as possible, be made considerably longer than it is intended to remain, so that the tenon may be driven tightly in, and the superfluous wood cut off afterwards.

The above regulations may be varied, at will, according as the tenoned or mortised piece is weaker or stronger.—JOINER.

69. VENEER.—Scrape away the glue, tooth the surface in an oblique direction to the fibres, and, in proportion as the surface requires regularity, set the plane finer. The final part of the operation of planing is accomplished by a fine tooth plane. Remove all the marks of the tooth plane with a scraper, and finish the surface with glass-paper or with pumice-stone. Veneers, being of a closer texture than solid wood generally, do not require so much labor as open-grained solid wood.—CABINET MAKER.

70. FURNITURE PASTE.—Scrape two ounces of beeswax into a pot or basin; then add as much spirits of turpentine as will moisten it through. At the same time powder an eighth part of an ounce of resin, and add to it, when dissolved to the consistence of paste, as much Indian red as will bring it to a deep mahogany color. Stir it up, and it will be ready for use.—C. M.

71. PICTURE FRAME.—The panels referred to are incised and ebonized. They may be inlaid, or the incisions may be colored or finished, according to the taste of the builder, or material used. A V tool is the best for starting incised work, but others will suggest themselves to the operator. I have seen very good work done with ordinary chisels and gouges.

Whittler will find a very neat design for a picture frame on Plate 48, June number of the WOOD-WORKER. It is handsome and easily made.—OLD BOY.

Drawings for the Million.

THE complete clearing out of our "Detail Sheets" has encouraged us to offer the following packages of valuable drawings for sale, at the extremely low price of one dollar a package.

Each package will contain over two hundred designs, with all the necessary explanations and descriptions; also, a valuable amount of building information, consisting of tables, rules, recipes, price-lists, etc., etc. Three of these packages bound together will make a very useful work of reference for the architect, builder, carpenter, joiner, or any one connected with the building trades:

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Package No. 2 contains 15 elevations with plans of cottages and villas, 3 elevations and plans of churches, also over 200 designs of piazzas, bay-window cornices, hood brackets, gable triangles, chimney caps, crestings, window-caps, trusses, dormers, doors and frames, porches, corner finish, canopies, cornice arch, screens, gutters, brick and wood work, beltings, stair-balusters, newel-posts, flues, etc., etc. Price $1.

Package No. 3 contains 39 elevations and plans for cottages, villas and dwellings; 10 elevations and plans for churches; and 146 designs for brick and stone work, shipwork, half-timbered work, verandas, drawing lessons, windows, doors, etc., etc.; also 26 designs of cornices, panels, etc., for plasterers. Price $1.

Package No. 4 contains 51 plans and elevations for cottages, villas, barns, stables, and railway stations; also, 5 plans and elevations of churches; and 115 detail drawings of scroll-work, windows, bay-windows, gables, verandas, side finish, newel-posts, shipwork, general house details, bay-window frames, frieze cornices, balustrades, oriel window, fences, gates, vestibule and front door, open timber roofs, etc., etc. Price $1.

Package No. 5 contains 72 elevations and plans of cottages, city houses, banks, villas, and country houses; also plan and elevation of schoolhouse, and 125 detail drawings of desks, counters, doors, door finish, piazzas, gables, dormers, wainscoting, chimney-cases, ceilings, front gables, porches, verandas, timber roofs, crestings, towers, vanes, stairs, mantels, balusters, newels, grilles, cornices, gateways, railing, etc., etc.

This is an excellent package. Price $1.

Package No. 6 contains 38 plans and elevations of cottages, villas, and country houses; 3 plans and elevations of churches; and 185 detail drawings of fences, doors, windows, stairs, mantels, verandas, porches, stoops, carved work, gates, summer-house, newel-posts, balusters, wrought-iron work, chimney-tops, gables, examples of furniture, finials, bay-windows, dormers, hoods, arches, oriels, truncated gables, turned work, cornices, church furniture, counters, etc., etc.

Besides the above illustrative and necessary descriptive and explanatory matter, this package contains a series of illustrated papers on the use of the steel square. This package is an excellent one for carpenters and joiners who do work in the country towns, as the details are numerous and easily understood. Price $1.

Package No. 7 contains 44 plans and elevations of cottages and villas; 164 detail drawings of roofs, mantels, windows, doors, balconies, verandas, stairs, newels, piazzas, vanes, dormers, pews, church finish, chimneys, brickwork, porches, cornices,

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pinnacles, brick arches, etc., etc. There are also five plans and elevations of churches, with all the necessary details drawn to scale; also, a railway depot, plans, elevations, and details.

This is perhaps the most useful package in the whole series for the general workman. Price $1.

Package No. 8, besides containing 60 plans and elevations of various kinds of cottages and other dwellings, has also 123 detailed drawings of miscellaneous designs of a useful character; also 3 plans and elevations for a stable; a tenement-house, and 41 cuts illustrating saw-filing in all its branches.

This package also contains a series of papers on saw-filing that cannot fail to be useful to the operative mechanic. Price $1.

Package No. 9 contains 78 plans and elevations of building; 36 designs for centre-pieces, cornices, and other plasterwork; 2 churches, stable with all the necessary drawings, and the usual amount of detail drawings; also 7 cuts illustrative of saw-filing, including all necessary descriptive and explanatory matter. Price $1.

Package No. 10 contains over 30 elevations and plans of handsome cottages; 3 for churches, one a frame showing all the details and framework; also three stables, a town bank with details of interior finish, showing desks, counters, screens, teller's office, etc., etc. This package also contains 30 illustrations on hand-railing with all necessary text, and the usual amount of detail drawing.

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Package 11 contains a large number of illustrations consisting of cottages; 36 examples of ornamental brickwork; 40 examples of plasterwork, panels, cornices, centre-pieces, etc., etc.; also full-sized details of cottage finish. This package also contains the plans and elevations of a store, with a full set of details, showing front, counters, shelving, cornices, cases for goods, tables, and all other necessary details. There are also a number of designs for gates and fences, and many other useful drawings. This is one of the best packages in the series. Price $1.

Each of the above packages will contain five, or more, large detail sheets, 22 × 34 inches, 40 sheets 9 × 12 inches, of original or selected designs, and 120 pages of reading matter relating to the building and decorative trades.

N.B.—We wish it distinctly understood that all the above matter was published in the AMERICAN BUILDER during the years 1874, 1875, 1876, 1877, and 1878; therefore parties having copies of the BUILDER for those years will have no use for any of these packages.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

Plate 33, Perspective View of Cottage; Plate 34, Perspective View and Plan of a Suburban Stable; Plate 35, Plans, Elevations, and details of a Dining-Room Mantel; Plate 36, Plans, Elevations, and details of a Vestibule.

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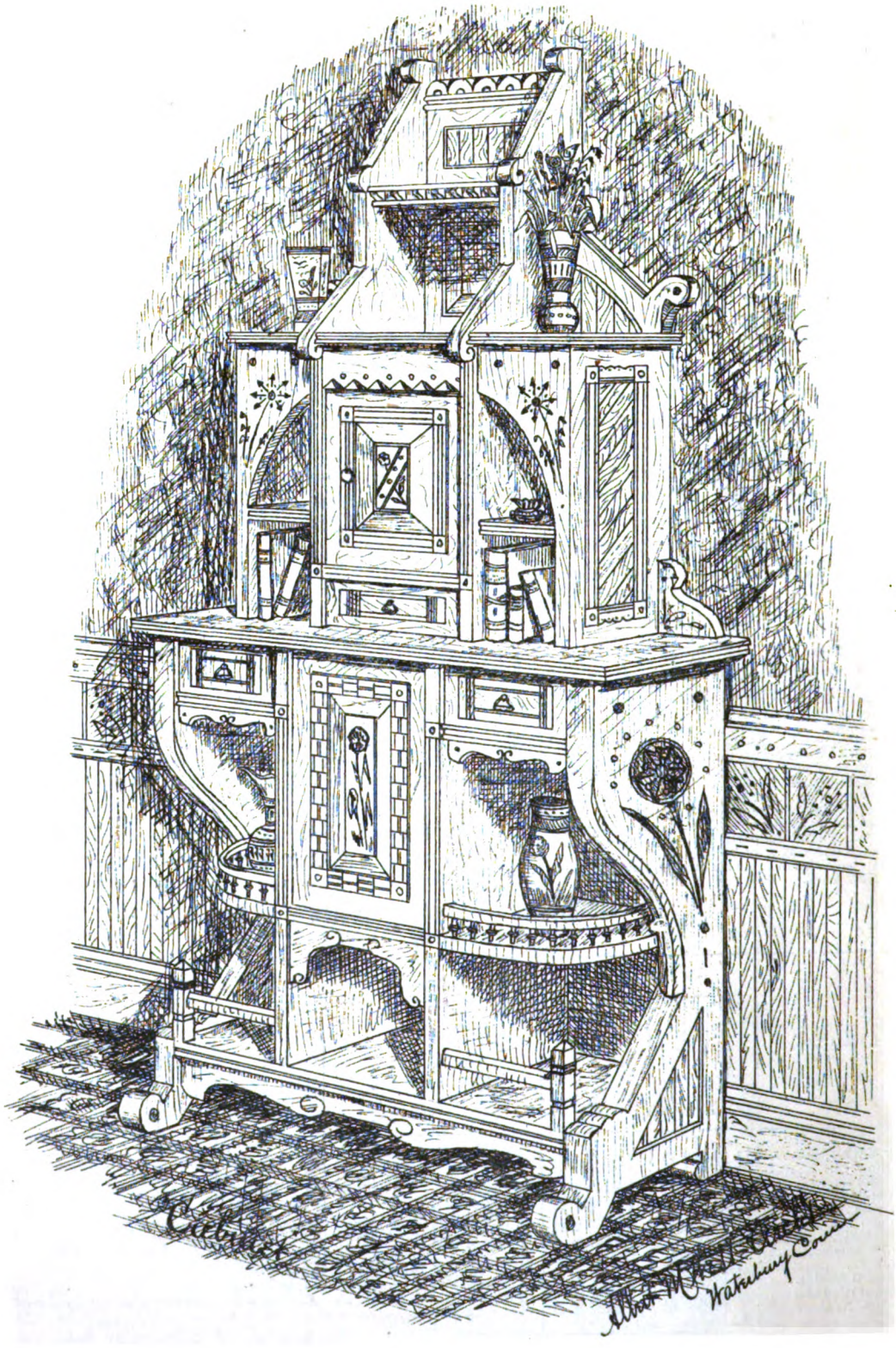
PLATE 80



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VOL. I NO. 11 NOVEMBER, 1879. PRICE TEN CENTS.

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ILLUSTRATIONS.

Sketch of Piano; Problems in Hand-railing; Problems for the Steel Square; Mantel; Chamber Suite; Examples of Swiss Architecture; Pulpit; Wardrobe design; Dining-room Sideboard.

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Our Illustrations.

ON our title-page we show a sketch of a grand piano by Mr. Fieder. The wood-work of this instrument is solid throughout, as the peculiar style in which it is constructed will not admit of veneer being used to cover defective workmanship. The design is suggestive.

Plate 82 is illustrative of a problem in Hand-railing. Full explanations are given elsewhere.

On Plate 83 we show several problems which may be solved by a proper application of the steel square. The methods of application are fully described on page 166.

Plate 84 shows a design for a mantel and fireplace. The pictures are fastened directly in the wall by the surrounding mouldings. The design is furnished us by Walter H. Griffon.

Plate 85 is a design for a chamber suite to be executed in black walnut, trimmed with French veneer, mouldings ebonized; the panels are ornamented with marquetries. The design was prepared by Geo. W. Rich, Quincy, Ill.

Plate 86. This plate exhibits a number of examples of Swiss architecture. Explanations are unnecessary.

On Plate 87 we show two designs by Geo. W. Rich—one of a pulpit, and the other of a wardrobe. The pulpit is designed to be executed in black walnut, ebonized where good taste would suggest. The columns to be of Tennessee marble, or of walnut veneered with butternut burl. The wardrobe would look best finished plain, in walnut, oak, or ash, as might be suggested by circumstances and its surroundings.

Plate 88 is a very handsome design of a sideboard; it is in the same style as the mantel and fireplace shown on Plate 84. One feature in this design is the opening through the centre to the butler's pantry, through which dishes etc., may be passed. The opening is covered when not in actual use, by curtains which are hung on a bar at the top. This design was furnished us by Mr. Griffon.

Parties desiring the services of a good draughtsman should address Walter H. Griffon, 111 West Thirty-eighth Street, New York City.

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THE long winter nights will soon be at hand, and many young men employed in country shops will have many spare hours on their hands, hours that may be spent in mischief or dissipation, to the great disadvantage of their future welfare and their employers' immediate profits. To assist in preventing such a state of affairs is the duty of every one, and we hope the WOOD-WORKER will not be behind in performing its part; and if employers and foremen will only introduce it to their workmen and boys, and see that they all get it regularly, they will be amply repaid by the extra intelligence and skill that will surely be evinced by their employés.

APPRENTICES who read our paper and see the designs we publish, are sure to be attacked sooner or later with a desire to execute

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some one or more of the illustrations. Bosses should always encourage and assist them, when these attacks occur, by advising them as to the best methods of going to work at them, and by allowing them to have bits of waste stuff, free of charge, and permitting them to use such tools as they may want—under certain restrictions, of course—and showing them their use. Boys like to make "things" themselves, and the desire is instinctive and should be encouraged and cultivated wherever found. It is that desire that has made the United States the home of invention and placed her in the first ranks as a manufacturing and industrial nation. Encourage the boys to work, not at a task, but at something that the labor of constructing will be considered a pleasure.

Boys will have pleasure of some kind, and the forerunner of a skilful mechanic in his young days, is sure to be found amusing himself at times, making wooden spoons, kites, or miniature steamboats, which amusement is sure to develop, when the boy becomes an apprentice, into making desks, writing-tables, cabinets, brackets, and a thousand and one other things, more or less useful. At this stage of the boy's life, nothing will be more pleasing, more useful, or more instructive for him to possess than a BOUND VOLUME OF THE WOOD-WORKER; and as the holidays are near at hand, and every employer, as a matter of course, will soon be looking around for Christmas and New-Year's presents to give to his apprentices, we deem it in order to suggest that he presents each one with a bound copy of the paper for 1879, or secures him a year's subscription for 1880.

Employers wishing to act on this suggestion, and having three or more apprentices, may obtain special rates in favor of their boys by sending the names of the latter to this office and stating the object.

PARTIES subscribing for the ILLUSTRATED WOOD-WORKER during the remaining two months of the present year, wherever possible, should have their subscription date from the first of the present year, as in a short time it will be utterly impossible to obtain back numbers. Those having part of the year, and wishing to obtain early numbers to complete their files, should send for them at once, as the stock is disappearing rapidly.

NEW subscribers to the WOOD-WORKER for 1880 sending one dollar to this office during the next two months, will be entitled to the November and December of the present year FREE; thus obtaining fourteen numbers for the price of twelve.

We have already secured a large circulation, and, what is much more gratifying, a good name, but we trust our many friends will not relax their efforts in still further pushing the WOOD-WORKER where it will be noticed, for we are satisfied that it has only to be known to be appreciated and purchased. We shall not rest satisfied until we number 50,000 of a circulation; and if we may judge by the "signs of the times," this figure will be reached before the end of 1880.

WITH an increase of subscriptions, we shall be enabled to make some very marked improvements in the paper, and all those who are now taking it will still get greater value for their money if they but assist us to double our present circulation. We are willing to pay a large commission on all new subscriptions sent us, where the amount exceeds three dollars. Commissions will be paid in cash, books, or extra copies of the WOOD-WORKER. Write us for particulars.

MANY of our subscribers have inquired concerning architectural books, etc., during the past year, and we are sure that many of the answers we have given them have resulted in purchase; we have, therefore, thought it well to remind our readers that we are in a position to furnish any books published in this country at the lowest catalogue prices, and we ask our subscribers, as a favor, to order their books DIRECT FROM US. Catalogues of architectural books sent to any address from this office on application. We are also prepared to furnish drawing instruments, paper, ink, or other materials the draughtsman or wood-worker may require.

So many of our "packages" have been sold out that we have been obliged to change the numbers and offer them in another shape. We now give "eight packages" for five dollars. This is the BEST OFFER EVER MADE of architectural drawings. See our advertisement on page 174, "Drawings for the Million," and send five dollars and secure the whole set before some of the numbers give out. Don't delay, for they cannot last long, and if you lose them you will be sorry for it.

MRS. CHRISTINE OLENSON, of Chicago, lives, with her husband, in a modest tenement, nearly all the furniture of which was made by herself. Standing opposite the parlor door is a very handsome organ, the case of which is finely finished in a variety of hard woods. Upon the case is a very life-like bird in the act of seizing a cherry in its bill. On a front panel is an East Indiaman, full-rigged ship, under full sail. The latter, which is most excellently represented, is of a piece of dark wood whose grain is wavy, and which is neatly joined to produce the desired effect.

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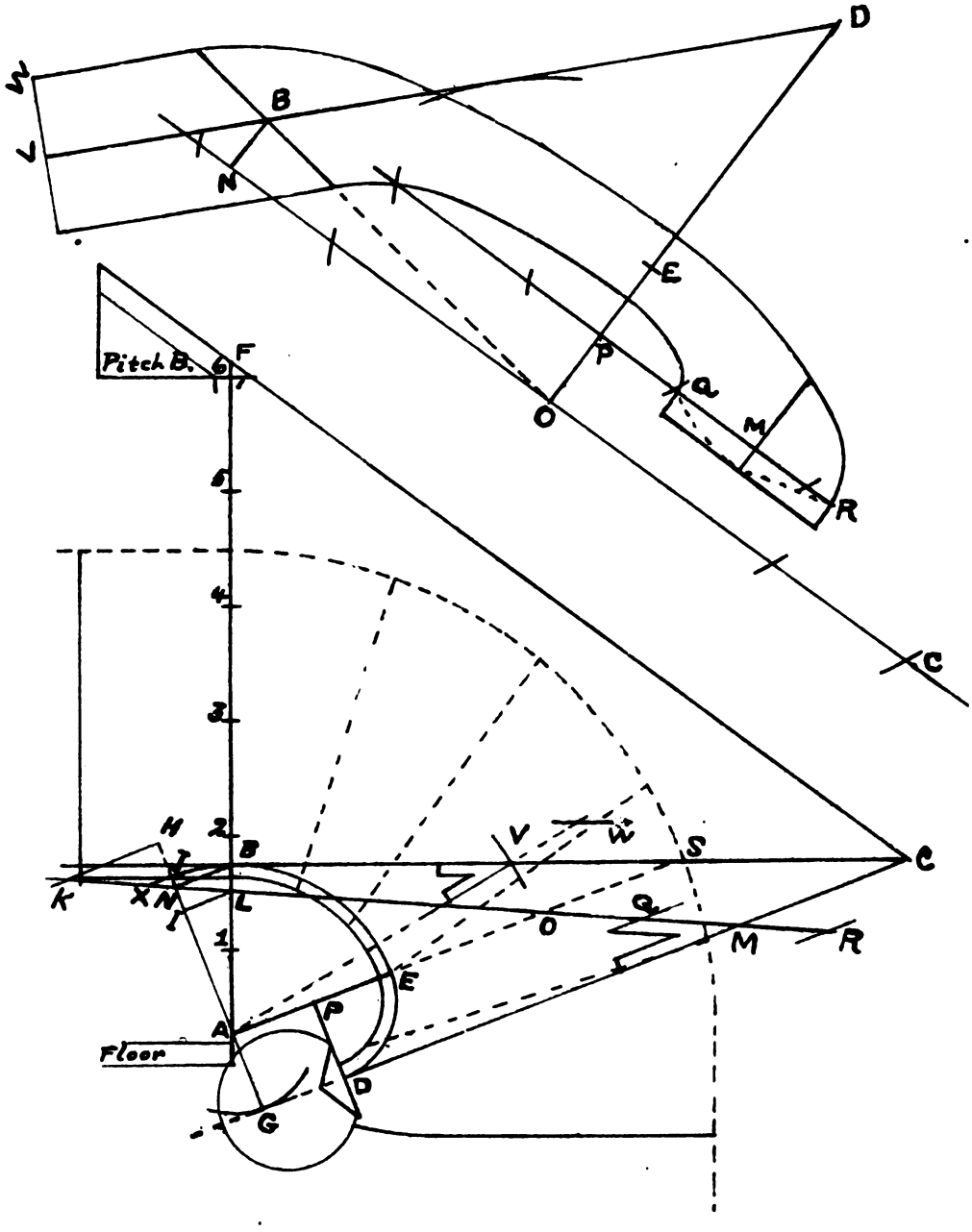
PLATE. 82.



HAND-RAILING.

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PLATE 83

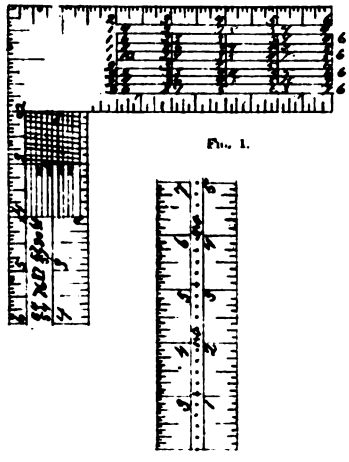

FIG. 1.

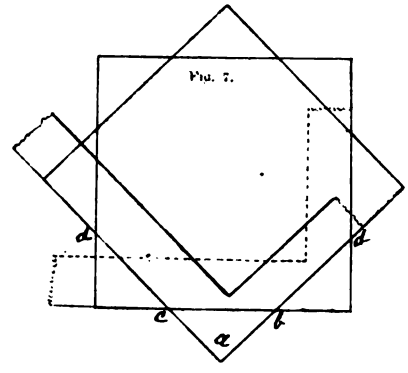

FIG. 2.

Wm. A. Hill,
Terre Haute, Ind.

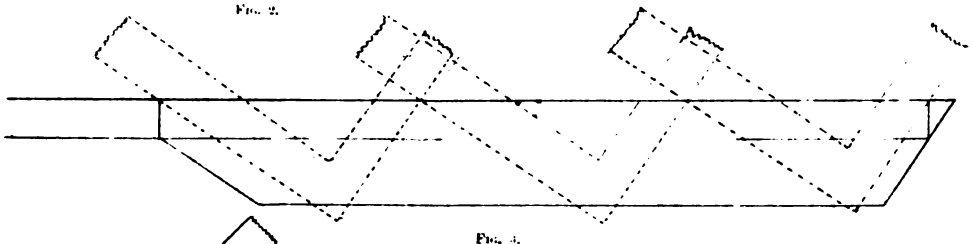

FIG. 3.

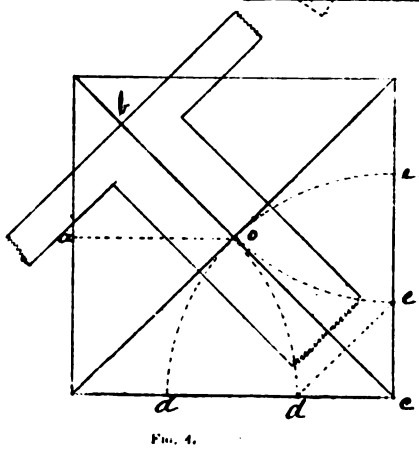

FIG. 4.

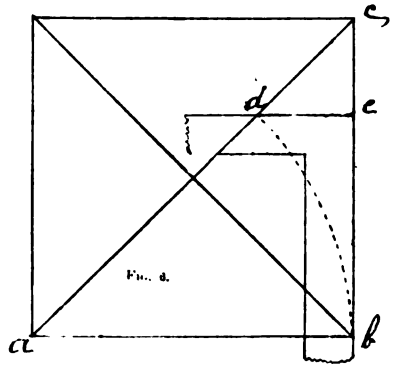

FIG. 5.

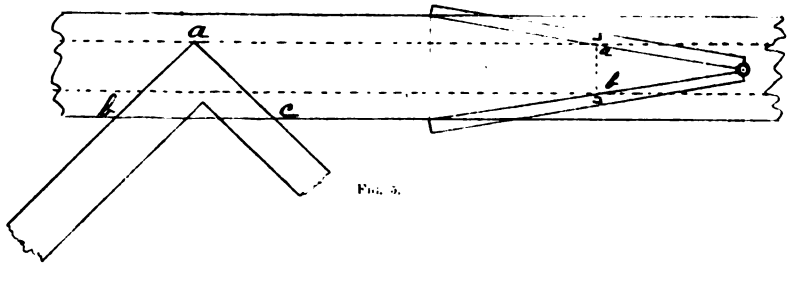

FIG. 6.

THE "STEEL SQUARE" AND ITS USES.

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A secretary occupies the other side of the room, and is constructed of three thousand pieces of wood. The design is unique, and the manner in which a number of secret drawers are stowed away is something marvellous. The centre-table is also of her construction, and is very handsome. The cornices, picture-frames, stools, and chairs are all from the deft fingers of Mrs. Olenson. A magnificently carved bedstead graces their sleeping apartment, and other articles of minor importance are scattered about the rooms. Mrs. Olenson has manufactured nearly all her wooden tools, and a greater part of her steel ones. She is thirty-six years of age, tall and straight, fair, pleasant, and determined. She was taught her trade by her father in the old country, and puts it to the good use of furnishing her own house in a style that would be envied by the majority of people in much better circumstances in life.

THE wooded country of Eastern Texas yields a rich variety of useful woods—yellow pine, cypress, red and white oak, live-oak, hickory, pecan, and cedar predominating. The Trinity, Sabine, Neches, Angelina, San Jacinto, and other rivers afford rafting facilities and water-power at times, although water is an uncertain commodity in the State, and nearly all mills have steam-engines. A new road will soon bisect the lumber district springing from Denison, near the Red River, and traversing the State to Sabine Pass, which is sixty miles east of Galveston, and already an important lumbering point.

SCREWS can be driven in easier and firmer, and with less liability of splitting the heads, by using a little soap in their threads.

"NEATNESS, order, and economy" should be the motto in every shop.

The Framing Square.

BY WM. E. HILL.

THE "framing square" is a steel tool having two arms at right angles to each other; the longer and wider arm is called the "blade," the shorter arm the "tongue." The blade in good squares is 2 inches wide and 24 inches long, while the tongues on the same squares are 1¼ inches wide and from 14 to 18 inches in length. A lucid description of the tool, with many of its capabilities, was published in the *American Builder* during the year 1876, and subsequently; some things, however, which were not described in the papers referred to I propose to discuss in this, and following papers.

Fig. 1, Plate 83, shows a portion of a first-class square; the diagonal scale on the tongue is designed to aid the workman in obtaining minute measurements. The lines between *a* and *b* are one tenth of an inch apart, so also are the lines between *b* and *c*. It will also be seen that diagonal lines are drawn across the spaces from point to point. The primary divisions are tenths, and the junction of the diagonal lines with the longitudinal parallel lines enables the operator to obtain divisions of one hundredth part of an inch; as, for example, if we wish to obtain twenty-four hundredths of an inch, we place the compasses on the "dots" on the fourth parallel line, which covers two primary divisions, and a fraction, or four tenths, of the third primary division, which added together makes twenty-four hundredths of an inch. Again, if we wish to obtain five tenths and seven hundredths, we operate on the seventh line, taking five primaries and the fraction of the sixth where the diagonal intersects the parallel line, as shown by the "dots," on the compasses, and this gives us the distance required.

The use of this scale is obvious, and needs no further explanation.

The "board measure," as shown on this square, gives the feet and inches contained in each board according to its length and width. Under Fig. 12 on the outer edge of the blade, the length of the boards, plank, or scantling to be measured is given, and the answer in feet and inches is found under the inches in width that the board, etc., measures. For example, take a board nine feet long and five inches wide; then under the Fig. 12 on the second line will be found the figure 9, which is the length of the board; then run along this line to the figure directly under the five inches (the width of the board), and we find three feet nine inches, which is the correct answer in "board measure." If the stuff is two inches thick, the sum is doubled; if three inches thick, it is trebled, etc., etc. If the stuff is longer than any figures shown on the square, it can be measured by dividing and doubling the result.

The "brace rule" is on the tongue of the square. This rule is easily understood; the figures on the left of the line represent the "run" or the length of two sides of a right angle, while the figures on the right represent the exact length of the third side of a right-angled triangle, in inches, tenths, and hundredths.

The "octagonal scale" (Fig. 2) is on the opposite side of the square to the "brace rule," and runs along the centre of the tongue. Its use is as follows: Suppose a stick of timber ten inches square. Make a centre line, which will be five inches from each edge; set a pair of compasses, putting

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one leg on any of the main divisions shown on the square in this scale, and the other leg on the tenth subdivision. This division, pricked off from the centre line on the timber on each side, will give the points for the gauge-lines. Gauge from the corners both ways, and the lines for making the timber octagonal in its section are obtained. Always take the same number of spaces on your compasses as the timber is inches square from the centre line. Thus, if a stick is twelve inches square, take twelve spaces on the compasses; if only six inches square, take six spaces on the compasses, etc., etc.

Fig. 3 shows how a common rafter can be laid out, and the proper angles or levels obtained, by a practical application of the square. Avoid lining for a "lookout;" give ample length for projection. Take pitch of roof on tongue, and half the width of building on blade; the angle along edge of blade then, is the bevel of foot of rafter; the "lookout" or projection must be provided for independent of the actual length of the rafter. Run the square along the rafter as many times as there are feet in half the width of building.

To find the hypothenuse when the base and altitude are given: let a equal altitude, b the base, then $a^2 \times b^2 = y^2$ the hypothenuse, etc. This is the rule on which the foregoing is based. Braces of different runs may also be found by the use of the square as above, under the principles contained in the rule. A full explanation of the use of the square for getting rafters and braces under the above rule, can be found in the *American Builder* for 1876.

Fig. 4 shows how an octagon can be produced by the aid of a steel square. Prick off the distance a o equal to half the distance of the square; mark this distance on the blade of the square from b to o, place the square on the diagonal, as shown, and square over each way. Do the same at every angle, and the octagon is complete.

To obtain the same figure with the compasses, proceed as follows: Take half the diagonal on the compasses, make a little over a quarter sweep from c, and at the intersection at d and e, then d and e form one side of an octagonal figure.

Again: take a piece of timber twelve inches square, as Fig. 5; take twelve inches on the blade from a to b, mark at the point a, operate similarly on the opposite edge, and the marked points will be guides for gauge-lines for the angles forming an octagon. The remaining three sides of the timber can be treated in the same manner.

These points can be found with a carpenter's rule as follows: Lay the rule on the timber, partly opened, as shown in the cut, "prick off" at the figures 7 and 17 as at a and b, and these points will be the guides for the gauge-lines. The same points can be found by laying the square diagonally across the timber and "pricking" off 7 and 17.

To make a moulder's flask octagonal proceed as follows: The flask to be four feet across. Multiply 4×5 (as an octagon is always as 5 to 12 nearly), which gives 20; divide by 12, which gives $1\frac{2}{3}$ feet, cut mitre to suit this measurement, nail into corners of square box, and you have an octagon flask at once.

Another method of constructing an octagon is shown at Fig. 6. Take the side as a b for a radius, describe an arc cutting the diagonal at d; square over from d to e, and the point e will then be the gauge-guide for all the sides.

Another method (Fig. 7) is to draw a straight line, c b, any length; then let a b and a c be corresponding figures on the blade and tongue of the square, mark along either and measure the distance of required octagon; move the square and mark also. Now use the square the same as before, and the marks c b and b d are the points required.

If these explanations are not sufficiently clear to the reader, the writer will be pleased to answer any questions regarding them that may be asked through the Question columns of the WOOD-WORKER.

Hand-Railing.

BY W. H. COOKEN.

FROM B, Fig. 1, Plate 82, square from B C draw B A extended and equal to $1\frac{3}{4}$ risers marked "floor;" produce A B to F and set up the number of risers from "floor," viz. 6; square over at 6 for tread of pitch-board and gauge from rake of pitch-board one half thickness of rail, placing gauge-mark fair to centre of baluster at 6; draw pitch as shown to B C at C; on A as centre with required centre radius of small circle of plan, strike arc seen at G, draw G C touching arc; draw A S parallel to G C; through A square from G C draw G H; extend curve E B to J, and make J H, J I each equal to one half width of rail; draw N B parallel to G C; make G M equal to B F and connect N M, produce the short lines Q (q) and R are parallel to M C one half width of rail distant therefrom. K H and I L are parallel to N B. Now draw N O C, Fig. 2, any length, and make O N equal to same letters at Fig. 1, square over N B equal to same letters, Fig. 2; square over O D equal to A S, Fig. 1; connect B D extended, B V being straight shank as required; make O P E P equal to A P E P, Fig. 1; draw P R M Q parallel to O C and equal to O R M Q, Fig. 1. Draw on each side of E one half width of rail and spring line B O. Stand on O as centre and take a

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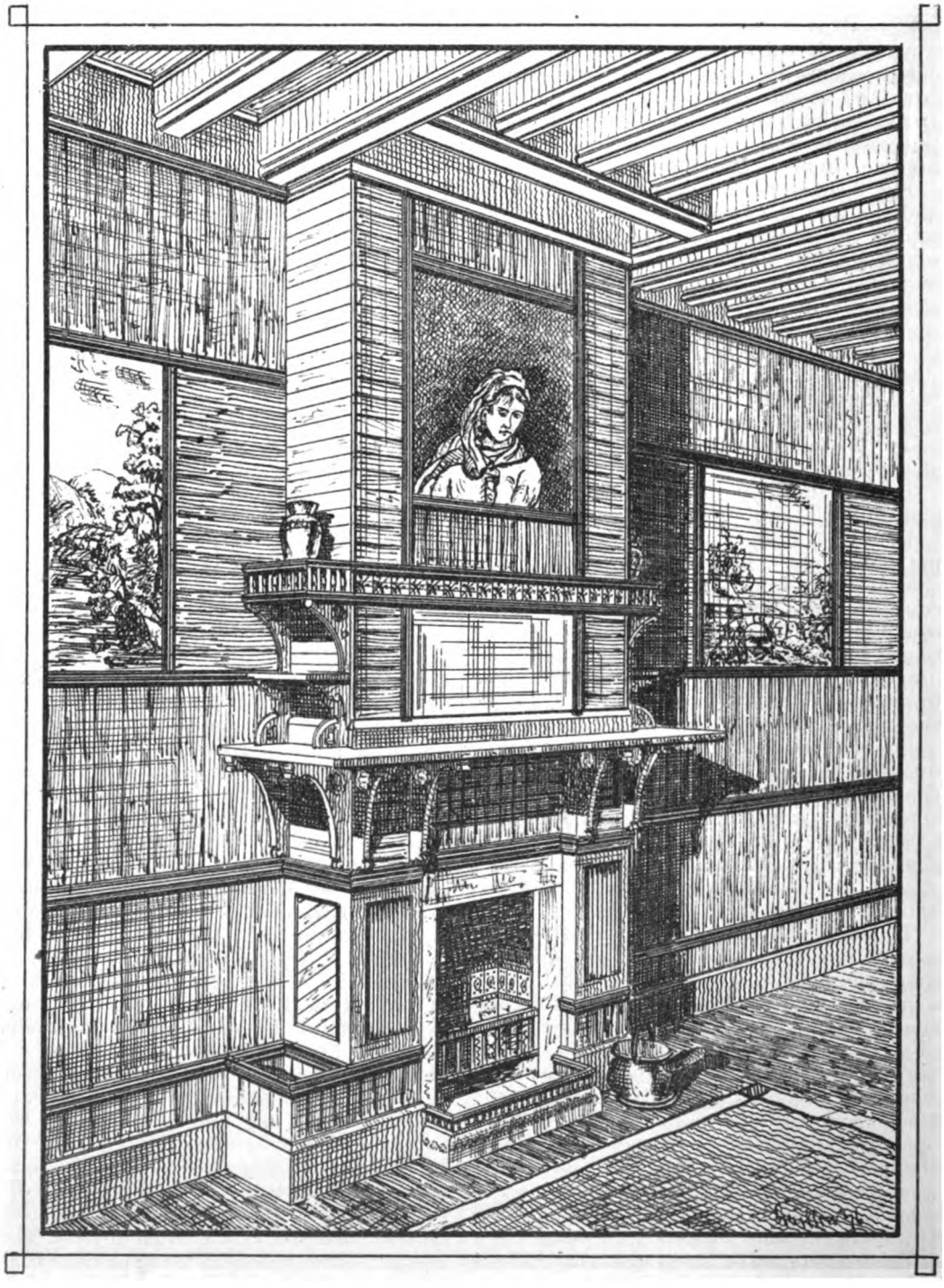
PLATE. 84



MANTEL.

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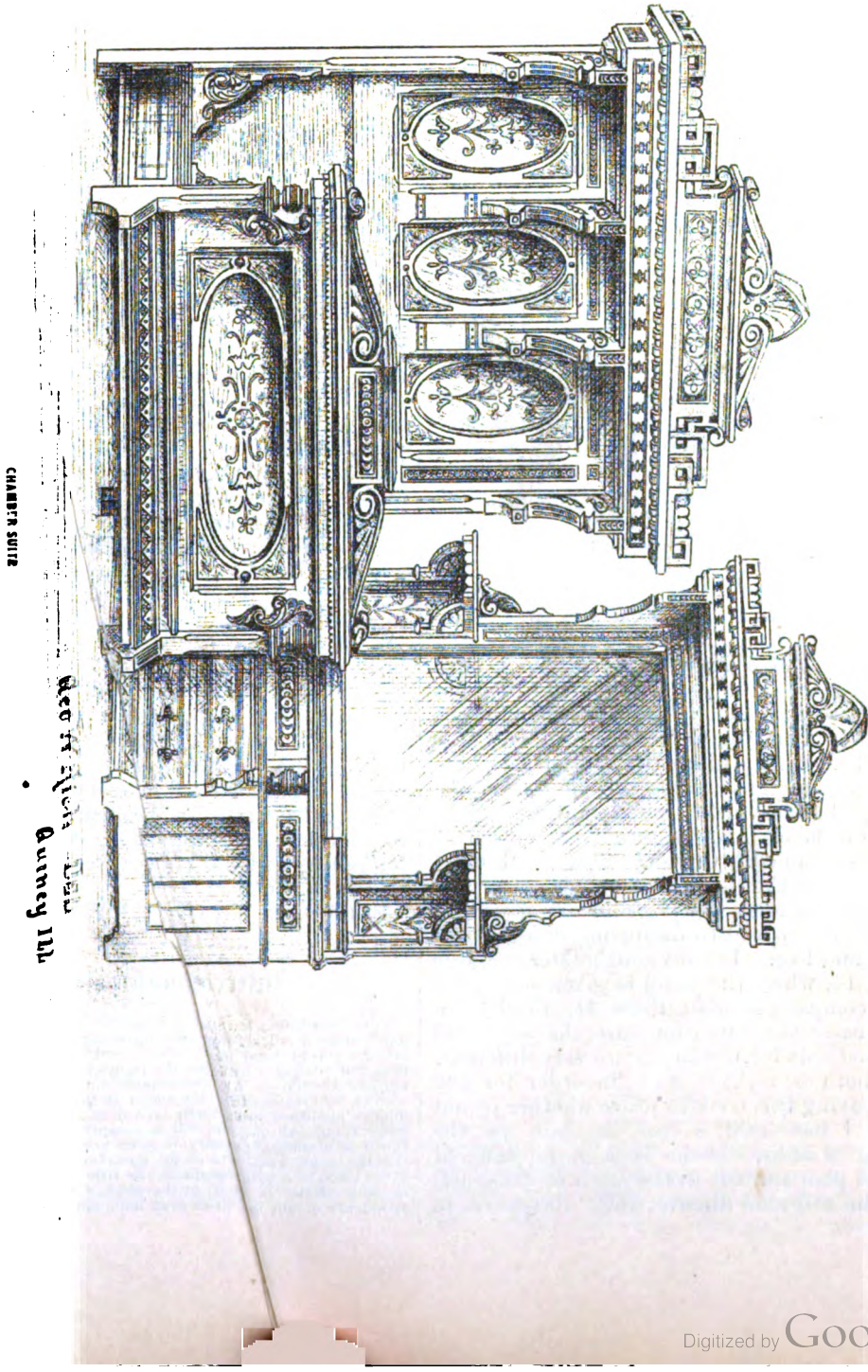
PLATE 85



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radius touching B D as shown by arc, shift to A, Fig. 1, and intersect at V, then V and M show bevels for upper and lower ends of wreath respectively. V W equals V; extend to cut W, Fig. 1, and W, Fig. 2 is set one half width of rail away from S V. Now, put in curves, which will be readily understood, as O Q, O R, Fig. 1, are the focal radii to get points for pins for smaller curve, and O L, O K the focal radii for large curve pins.

Correspondence.

WE invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of the Wood-Worker:

SOME time ago I sent a query to the WOOD-WORKER asking if any one of its readers had been able to execute a wreath as laid down in Plate 10 of Mr. Gould's book, the "American Stairbuilder's Guide." Answer No. 43 in August number of the WOOD-WORKER has opened the way for exposing the utter worthlessness of the book. I send you by this mail a drawing of the correct solution of the problem Mr. Gould has so befogged in his book. I look upon the "American Stairbuilder's Guide" as a cruel imposition on the novice into whose hands it might fall, and I rejoice to know that there is a means of showing up this humbug work through the columns of the WOOD-WORKER, and thus prevent many young workmen from being victimized through the errors that abound all through the work. I find that, with the single exception of Plate 2, and where the elevation tangents have the same pitch, not one of the elliptical curves are correct, and so great is the variation that at Plates 3 and 5 the centres, *c* of Fig. 3, should be respectively 3½ and 4 inches (!) removed toward the *assumed* focal points 3. But this error of putting in the curves might be passed over, as it would not entail a loss of labor on the wreaths, other things being correct; the more serious error, however, of taking the wrong bevels, which would entail a great loss of labor and material, cannot be so easily condoned. On Plate 21 a wrong bevel is given for Fig. 3, so also at Plates 22 and 29, and the false bevels given are of such a nature as to lead to disappointment, confusion, and loss. Let any stairbuilder examine Plate 14, where the bevel is given correctly, and compare it with Plate 21, Fig. 3; in both cases the conditions are the same, yet the methods for the bevels are very different. Can both be right? Now, in order for any one having this book to prove whether or not what I have said is true, let him use the blocks as advised in the book in question, fit to the plan and cut to the pitch of tangents, and he will soon discover the "rottenness in Denmark." In conclusion, if "Bevel" will execute a wreath according to my drawing on Plate 82 of present number, which is suitable to the conditions of Plate 10 of Mr. Gould's work, he will have no trouble in arriving at a satisfactory result.

When a true method is adopted in determining lines for hand-railing, but little trouble arises, but there are so many "quack" works on the art afloat in the country that the young mechanic is liable to be deceived and discouraged at every turn. It was not "Bevel's" dulness to comprehend that caused his failure, but the false teaching and empiricism of the author of "Gould's American Stairbuilder's Guide."

W. H. COOKEN.

ORILLIA, ONT., Aug. 30, 1879.

Editor of the Wood-Worker:

I BECAME so befogged in the early chapters on the "Sectorian System of Hand-Railing," that I got disgusted with myself and the system, and finally gave it up. Have many of your subscribers mastered the method; if so, I would like to know? I was very much interested in Mr. Riddell's "Lessons on Projection," but there are some things in them that I do not understand. On page 140 there is a method described by him for getting out wreath-pieces, but I utterly failed to discover how the upper end is connected with the rise, and also to find the long diameter. I failed also to find where the angle of long diameter is located. Neither can I see how the short diameter is obtained, or how the angles from lower end to top of rail are described. While I would be glad to have these "points" fully explained, I acknowledge I have no claims either on you or Mr. Riddell to furnish me or other subscribers with brains. It seems to me that possibly Mr. Riddell has supposed the reader to have some knowledge of the subject in question, or that his lessons are so simple that but little explanation is thought necessary. I have copied, cut, and folded the lesson referred to, as directed, but still fail to thoroughly comprehend. If not asking too much, will you kindly give "more light" on the subject? P. S.

FULTON, N. Y., Oct 6, 1879.

Intercommunication.

THIS department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the NUMBER and TITLE of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessa-

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rily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

85. STAIN.—Will some one inform me through your columns, how I can stain the inside of drawers satinwood?—MOLOCK.

86. OLD FURNITURE.—I have some old mahogany furniture that requires repairing, and I wish to do the work myself, being pretty skilful with tools. How can I make the new work "match" with the old?—AMATEUR.

87. CARVER'S SQUEEZING WAX.—Please explain what is meant by the phrase "Carver's Squeezing Wax," as I would like much to know, and also the purpose for which it is used.—YOUNG CARVER.

88. MAHOGANY SIDEBOARD.—I desire to renovate an old mahogany sideboard; how should I go about it?—YOURS TRULY.

89. VENEERS.—I have been informed that veneers can be dyed through and through; is this so? If so, will you or some fellow-reader explain the process to—CURIOSITY?

90. PICTURE-FRAMES.—I have never yet seen any large picture-frames made of thin metallic substances. Is there any reason why they should not be made of some thin metal? I am sure they would be lighter to handle and would hang with greater security than the great clumsy things that adorn—or disfigure, perchance—our walls.—ART.

91. GLUE.—How can I prevent glue from cracking?—GOUGE.

92. AILANTHUS.—I have seen it laid down somewhere that ailanthus made good wood for cabinet-work and house-finishing; can you refer me to the work or give me a synopsis of it?—MURRAY.

93. PIANO.—Of what materials are pianos made, and would it be possible for a skilful amateur to construct one?—HOPEFUL.

94. SUN-TRACINGS.—Will you or some reader publish the recipe for making sun-tracings? Our architects in the West, and those who understand the process, keep it a profound secret.—YOUNG DRAUGHTSMAN.

95. CANE.—What is the meaning of the term "Caul warm or cold"?—Z. F. J.

APPRENTICE, of Boston, is informed that "Hints on Estimating" is a small pamphlet, price six cents.

Answers.

WE wish it distinctly understood, that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

72. DRAWINGS.—If J. P. R. will get a copy of "Warren's Drafting Instruments and their Operations," price $1.25, he will find it contains all the information he asks for.—SCALE.

44. SAW.—To take the buckles out of a saw, lay it on a hard level surface—the end of a piece of hard timber is best—then take a bar of lead or a sheet of brass or copper, or any other soft metal, or even a tough piece of wood, say half an inch thick, and lay it on the saw over the buckle. Then with a heavy hammer, strike a blow sufficiently heavy enough to straighten the saw under it. By a little practice and experience all the kinks and buckles can be taken clean out. Never strike a saw with the face of a hammer, or it will stretch the blade and make a "kink" in it where it is not required.—W. H. CLINE.

81. POLISHING.—After staining, size over with varnish or polish; for mahogany, walnut, and similar woods, finish the surface with No. 0 sandpaper; oil with linseed-oil, colored red with alkanet-root; let them stand for a time until the oil has thoroughly soaked in, then proceed to fill in the pores with the following composition: Plaster of Paris, three parts; tallow, one; and a little red polish (ordinary polish colored with dragon's blood). Work the whole until it is thoroughly mixed and becomes a crumbly mass. Rub well into the wood with a piece of rag, clear off all the superfluous filling-in, and the surface is ready to body-in and polish.

82. STAINED WORK.—Scrape all the varnish, etc., off till you come to the wood, then stain and varnish again. The best tool for scraping is one which is made for the purpose; but if you don't possess a scraper, and cannot get one, a plane-iron would be about the best substitute. Finish with sandpaper. Vandyke brown makes a very good dark oak stain ground and mixed with a little beer. Put this on evenly with a brush, and when dry varnish.

83. BLACK AND GOLD FRAMES.—The black or black and gold frames are French polished. This must be done once, having a good surface, either on veneer or on hard-wood frames. First remove all old gilt, dirt, etc., paper well with sandpaper until a

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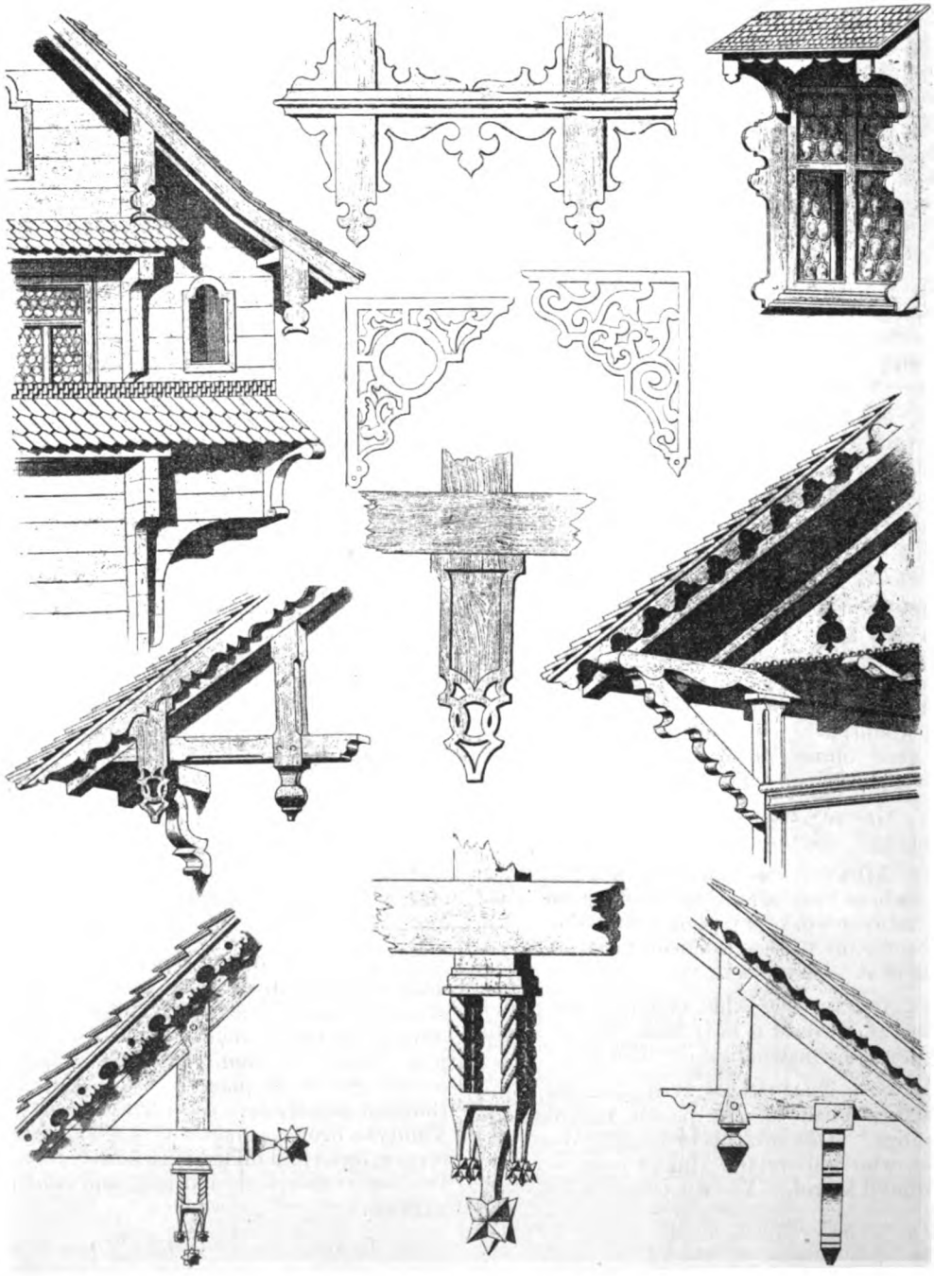
PLATE. 86



EXAMPLES OF SWISS ARCHITECTURE.

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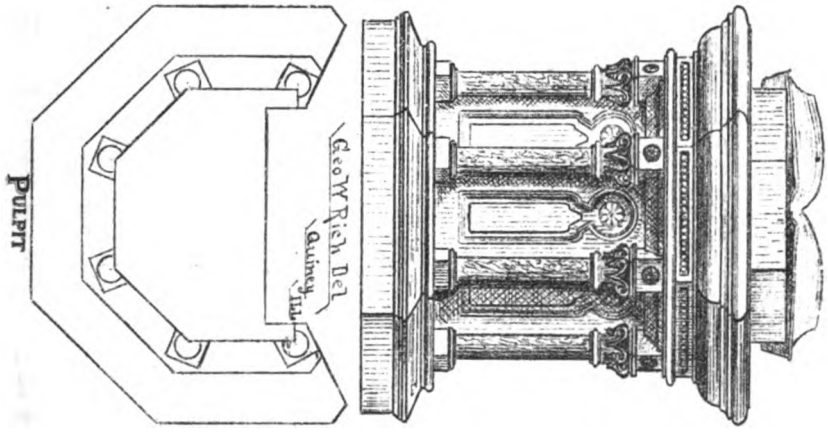
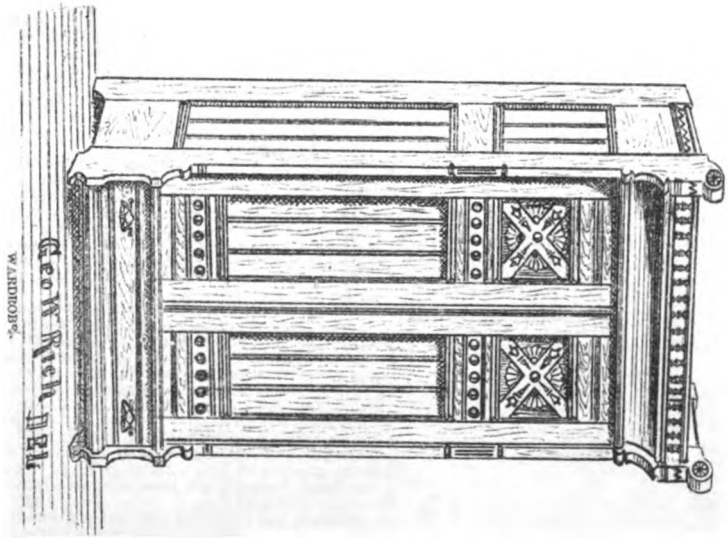
PLATE 87





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smooth surface be obtained; then boil one half pound logwood chips in water for one hour, brush this liquor over while hot, and when dry give another coat; then brush over the frame with the following liquor: one half ounce green copperas in half pint hot water, stirring with a stick. When dry, paper smooth, using very old or the very finest sandpaper. Now procure say one pound black japan, pour a small quantity in a cup, and thin with turps until of the consistency of paint. Brush this carefully over the frame, using a clean fine hair paint-brush. When dry, give another coat. The frame should be varnished in a warm room free from dust. When set, the frame will have a handsome appearance, and will not chip. If a gold line be preferred inside, when the frame has had one coat remove carefully with sandpaper any japan that has run on the part to be gilt, then varnish carefully all other parts, but avoid letting any particle of the japan run on the part to be gilt. When dry, procure a small quantity, say half gill, of best japanners' gold-size, warm the size by standing the bottle in warm water, pour a little of the gold-size in a saucer, and with a camel's-hair brush go very carefully over the part to be gilt; place the frame aside for two or three hours, lay a sheet of gold-leaf on a cushion, cut the gold in strips with a blunt knife, take up a strip of gold on the tip, lay it evenly on the gold-sized line until the whole is covered, then press gently the gold-leaf with a pad of the best cotton-wool; when quite dry, say after forty-eight hours, procure a sheet of fine tissue-paper, wrap it round a paper-knife, and gently burnish the gold by rubbing carefully backward and forward; should the gold in any place be rubbed off, touch with gold-size, add a piece of gold-leaf, and when wet, burnish carefully. Those who care not to take the trouble may use the gold-bronze powder, put on with a brush, using best copal varnish one part, and turps one part.

WE invite answers to the following Queries for our December number. If not answered before we go to press with the December number (24th of November) we shall "drop" them, as we begin the new volume in January, 1880, with a fresh series of Questions:

39. Cupboard.
45. Planes.
63. Statuary.
72. Drawings.
73. Flower-Stand.
74. Window-Garden.
75. Fruit and Cigar Stand.
77. Spring and Plumb Bevel.
78. Dimensions.

WOOD POLISH.—If it is desired to retain the natural color of the wood, the carving may be simply oiled with linseed oil, or if a higher polish is wanted, use white hard varnish with a camel's-hair brush in a warm room. This is a very durable varnish.

Drawings for the Million.

OWING to the complete clearing out of some of the packages previously advertised, we have been obliged to reduce the number to eight. We have also reduced the price of the set of eight packages to FIVE DOLLARS, thus placing within the reach of every enterprising, go-ahead carpenter, builder or architect an opportunity of obtaining an encyclopædia of building and architectural information that could not be secured in any other form for twice the amount.

Our stock of these DRAWINGS is limited, and we advise those desiring a full set to send in orders at once. In order to give all our readers a chance to secure complete sets, we will, on the receipt of one dollar, send any one package to their address, and hold the remaining seven for one month, which, upon the receipt of four dollars more any time during the month, will be forwarded to the person sending. Those wishing to take advantage of this offer, will mention the fact when sending for the one or more packages.

Each package will contain over two hundred designs, with all the necessary explanations and descriptions; also, a valuable amount of building information, consisting of tables, rules, recipes, price-lists, etc., etc. Four of these packages bound together will make a very useful work of reference for the architect, builder, carpenter, joiner, or any one connected with the building trades:

Two packages will be sent to one address for..... $1 75
Four packages for..... 3 00
Or the whole eight packages for..... 5 00

Package No. 1 contains 51 plans and elevations for cottages, villas, barns, stables, and railway stations; also, 5 plans and elevations of churches; and 115 detail drawings of scroll-work, windows, bay-windows, gables, verandas, side finish, newel-posts, shipwork, general house details, bay-window frames, frieze cornices, balustrades, oriel window, fences, gates, vestibule and front door, open timber roofs, etc., etc. Price $1.

Package No. 2 contains 72 elevations and plans of cottages, city houses, banks, villas, and country houses; also plan and elevation of schoolhouse, and 125 detail drawings of desks, counters, doors, door finish, piazzas, gables, dormers, wainscoting, chimney-cases, ceilings, front gables, porches, verandas, timber roofs, crestings, towers, vanes, stairs, mantels, balusters, newels, grilles, cornices, gateways, railing, etc., etc.

This is an excellent package. Price $1.

Package No. 3 contains 38 plans and elevations of cottages, villas, and country houses; 3 plans and elevations of churches; and 185 detail drawings of fences, doors, windows, stairs, mantels, verandas, porches, stoops, carved work, gates, summer-house, newel-posts, balusters, wrought-iron work, chimney-tops, gables, examples of furniture, finials, bay-windows, dormers, hoods, arches, oriels, truncated gables, turned work, cornices, church furniture, counters, etc., etc.

Besides the above illustrative and necessary descriptive and explanatory matter, this package contains a series of illustrated papers on the use of the steel square. This package is an excellent one for carpenters and joiners who do work in the country towns, as the details are numerous and easily understood. Price $1.

Package No. 4 contains 44 plans and elevations of cottages and villas; 164 detail drawings of roofs, mantels, windows, doors, balconies, verandas, stairs, newels, piazzas, vanes, dormers, pews, church finish, chimneys, brickwork, porches, cornices, pinnacles, brick arches, etc., etc. There are also five plans and elevations of churches, with all the necessary details drawn to scale; also, a railway depot, plans, elevations, and details.

This is perhaps the most useful package in the whole series for the general workman. Price $1.

Package No. 5, besides containing 60 plans and elevations of various kinds of cottages and other dwellings, has also 128 detailed drawings of miscellaneous designs of a useful character; also 3 plans and elevations for a stable; a tenement-house, and 41 cuts illustrating saw-filing in all its branches.

This package also contains a series of papers on saw-filing that cannot fail to be useful to the operative mechanic. Price $1.

Package No. 6 contains 78 plans and elevations of building; 36 designs for centre-pieces, cornices, and other plasterwork; 2 churches, stable with all the necessary drawings, and the usual amount of detail drawings; also 7 cuts illustrative of saw-filing, including all necessary descriptive and explanatory matter. Price $1.

Package No. 7 contains over 30 elevations and plans of handsome cottages; 3 for churches, one a frame showing all the details and framework; also three stables, a town bank with details of interior finish, showing desks, counters, screens, teller's office, etc., etc. This package also contains 30 illustrations on hand-railing with all necessary text, and the usual amount of detail drawing.

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Package 8 contains a large number of illustrations consisting of cottages; 36 examples of ornamental brickwork; 40 examples of plasterwork, panels, cornices, centre-pieces, etc., etc.; also full sized details of cottage finish. This package also contains the plans and elevations of a store, with a full set of details, showing front, counters, shelving, cornices, cases for goods, tables, and all other necessary details. There are also a number of designs for gates and fences, and many other useful drawings. This is one of the best packages in the series. Price $1.

Each of the above packages will contain five, or more, large detail sheets, 22×34 inches, 40 sheets 9×12 inches, of original or selected designs, and 120 pages of reading matter relating to the building and decorative trades.

N.B.—We wish it distinctly understood that all the above matter was published in the AMERICAN BUILDER during the years 1875, 1876, 1877, and 1878; therefore parties having copies of the BUILDER for those years will have no use for any of these packages.

One or more of these packages will be sent to any address in the United States or Canada, post-paid, on receipt of price.

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We cannot furnish any more full sets of "CHEAP DRAWINGS," as our large stock has been almost sold out. We can furnish two sheets, however, which contain over SEVENTY DESIGNS of windows, doors, doorways, chimneys, halls, porches, verandas, newels, dormers, cornices, etc., etc., for ten cents, which is only five cents a sheet. Thousands of persons who have purchased the CHEAP DRAWINGS, as first advertised, are well pleased with them, as they may well be, so great a number never having been offered before for so small an amount. The few hundreds we now have in hand will soon be exhausted, and another chance to obtain the same drawings for a like sum may never again occur, as we do not intend to reproduce another edition of them. Therefore, parties wanting these two sheets should send at once, or it may be too late.

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The following Contents for October number will give a general idea of the character of the Journal:

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OUR LITHOGRAPHIC ILLUSTRATIONS.

Plate 37, Perspective View of Cottage, with Plans; Plate 38, Elevation and Plan of a Catholic Church; Plates 39 and 40 show Plans, Elevation, and Details of a Queen Anne Cottage.

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(Revised monthly.)

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	Laborer.	Carpenter.	Stair-Builder.	Joiner.	Cabinet-Maker.	Finisher.	Painter.
	$	$	$	$	$	$	$
New York	1 50 @ 2 75	2 50 @ 2 75	2 25 @ 2 75	2 25 @ 2 50	1 50 @ 3 00	1 50 @ 3 00	1 50 @ 2 00
Boston	1 00 @ 1 50	1 50 @ 2 25	2 00 @ 2 25	1 50 @ 2 00	1 50 @ 2 50	.....	1 75 @ 2 25
Baltimore	1 00 @ 1 60	1 50 @ 2 50	2 25 @ 3 00	2 50 @ 3 25	2 50 @ 3 25	2 00 @ 2 75	1 50 @ 2 50
Philadelphia	1 25 @ 1 60	2 00 @ 2 50	2 00 @ 2 50	.....	1 50 @ 2 50	.....	1 50 @ 1 75
St. Louis	1 00 @ 2 10	2 00 @ 2 50	1 50 @ 3 00	.....	.....	1 50 @ 2 10	2 00 @ 2 50
Chicago	1 00 @ 1 25	2 00 @ 2 25	2 00 @ 3 00	1 75 @ 2 50	1 75 @ 2 50	1 50 @ 2 10	1 75 @ 2 25
Cincinnati	1 00 @ 1 50	1 75 @ 2 25	1 75 @ 2 50	.....	.....	....	1 75 @ 2 00
San Francisco	1 25 @ 1 50	2 00 @ 3 00	.....	1 50 @ 2 50	1 25 @ 1 50	.....	....
Texas	1 10 @ 1 75	1 75 @ 2 50	.....	2 00 @ 3 00	2 00 @ 3 00	.....	.....
Ottawa (Canada)	80 @ 1 10	1 25 @ 2 00	1 75 @ 2 50	1 50 @ 2 00	1 50 @ 2 00	1 00 @ 1 75	1 00 @ 1 75
Toronto (Canada)	1 00 @ 1 25	1 25 @ 2 25	2 00 @ 3 00	1 50 @ 2 25	1 50 @ 2 25	1 00 @ 2 00	1 00 @ 2 00
Raleigh, N. C.	75 @ 80	1 25 @ 2 00	2 00	.....	.....	.....	1 25 @ 2 00

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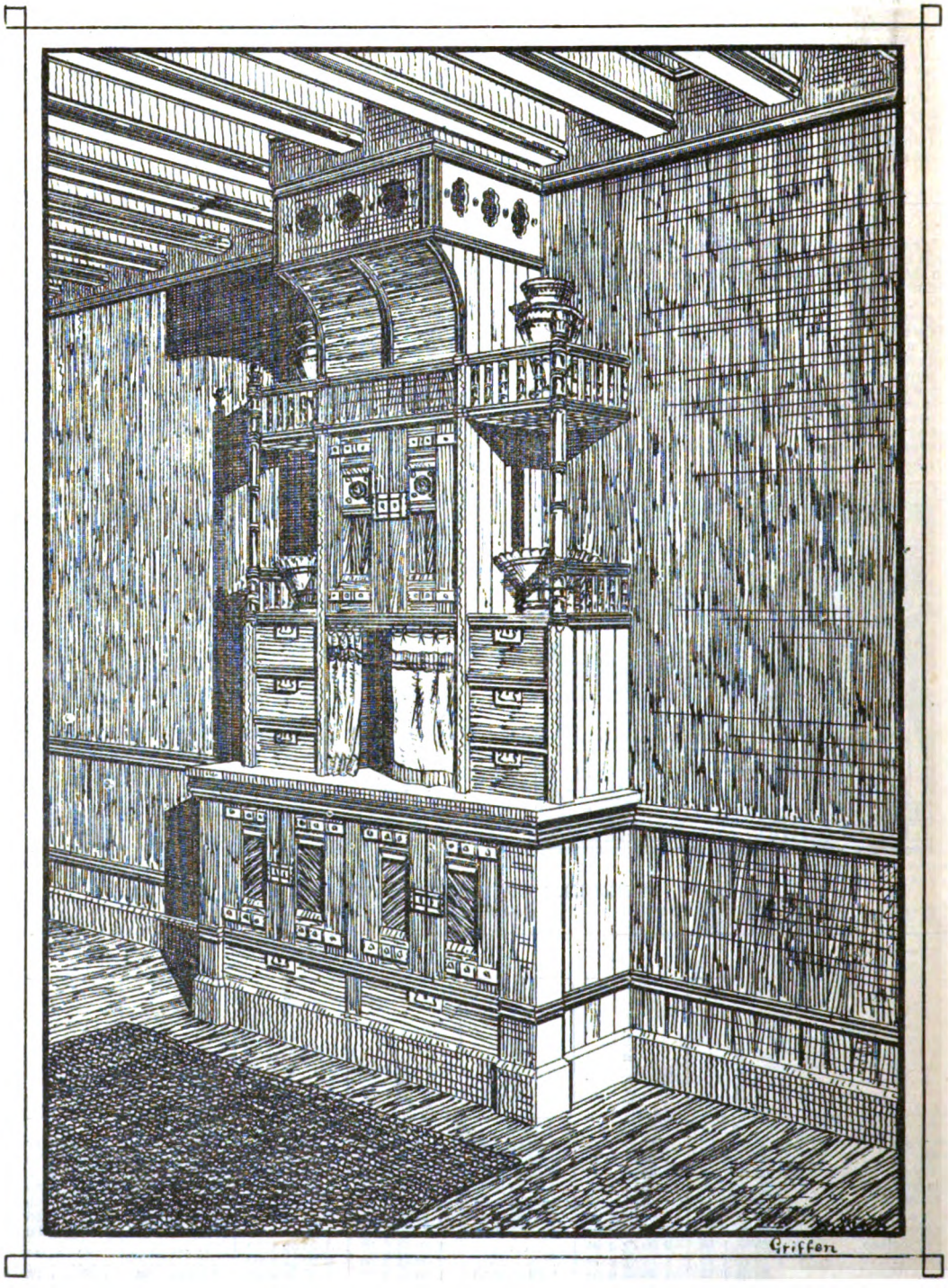
PLATE. 88



DINING-ROOM SIDE-BOARD.

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THE ILLUSTRATED WOOD WORKER

FOR JOINERS CABINET MAKERS STAIR BUILDERS CARPENTERS CAR BUILDERS &c. &c.

VOL. I. No. 12. DECEMBER. 1879. PRICE TEN CENTS.

Secretary. Designed By Geo W Rich. Chicago. Ills.

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Illustrated Wood-Worker.

TERMS OF SUBSCRIPTION.

One copy monthly, one year, - - - - - $1 00
Four copies, three months to one address, - - 1 00
Single copies, - - - - - - - - - 10

*** The ILLUSTRATED WOOD-WORKER will be sent to any person in the United States or Canada, who desires it, post free, on receipt of the above rates.

OFFICE:

No. 176 Broadway, New York City.

CHAS. D. LAKEY, *Publisher*. FRED. T. HODGSON, *Editor*.

All correspondence intended for the columns of the WOOD-WORKER should be sent to the Editor; but letters of a business nature, or which contain money or Post-Office orders, should be addressed to the Publisher. Rejected communications will not be returned unless the persons sending them remit return postage.

Entered at the Post Office at New York as second-class matter.

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ILLUSTRATIONS.

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☞ SUBSCRIBE for the WOOD WORKER for 1880 NOW! and get the December number for 1879 FREE.

Our Illustrations.

THE design for a secretary shown on our front page was furnished us by George W. Rich, of Chicago, Ill. It is designed to be made of walnut, and to have polished brass trimmings; the chamfers and incisions to be ebonized. The slanting fall above is a receptacle for papers, magazines, etc. The desk fall lets down and draws out.

On PLATE 90 we give a full page of working drawings of two useful pieces of bedroom furniture. They are made of oak, and are simply practical pieces of furniture, whose lines have been determined chiefly by the use for which they are intended. The scale to the several details is fully given, so that the drawings will be found to explain themselves.

PLATE 91 shows a design for a mantel, prepared for the WOOD-WORKER by Mr. George Rich. It is designed to be finished in black and gold. Other particulars may be obtained by addressing Mr. George W. Rich, Chicago, Ill.

PLATE 92 shows a design for a very handsome staircase. It was prepared for the WOOD-WORKER by F. W. Angell, Architect, Providence, R. I. This page shows elevations, sections, and plans, and is all drawn to scale. The most obtuse workman should experience no difficulty in understanding this page.

PLATE 93.—This plate was designed expressly for the WOOD-WORKER by F. W. Fieder, of this city. It shows a pedestal with all the details drawn to scale, and the dimensions and sizes of the various parts are all given. It may be made of any kind of wood, and stained and decorated to suit the taste. The top may be made of pine and covered with plush, or it may be finished in hard-wood. If desired, the panels on the sides, and the door may be omitted, and the shelf left exposed, it can then be used for bric-à-brac, or any appropriate ornaments.

PLATE 94 shows a number of examples of Swiss architecture. Explanations are unnecessary.

PLATE 95 shows two designs, one for a picture frame, with details drawn to scale; the other a wall table—the handsomest thing we have seen for some time—both of which are simple in construction and easily understood. The table should be made of some light-colored close-grained wood, such as maple, or cherry, or birch, and stained. The designs are furnished by F. W. Fieder.

PLATE 96 exhibits six excellent studies for amateurs. They are made of such materials as the taste of the maker may suggest. The ornaments on frame, foot-rest, and cloak-shelf look well ebonized. The panels on the music-stand may be veneered and have gold letters on their face; the members on the standards may be ebonized, and the lines on the frame gilded. The foot-rest and stool are designed to be covered with carpeting.

This plate was designed by George W. Rich.

WITH this number of the WOOD-WORKER the first volume is complete, and we think our readers will bear us out in the statement that we have accomplished all we promised them in our first issue. In fact, we met with such a favorable reception from the first that we found it due to our readers to exceed our promises and give them a *greater quantity of better material*, both in text and illustrations, than at first seemed possible. Now, however, all fears and doubts are past, and we feel that the WOOD-WORKER is established on a permanent basis, and that its supporters have confidence in its ability to prolong its days to a good round age.

Creditable as the first volume is, we can safely promise our readers better ones to follow, and we are sure our efforts in the future will be as fully appreciated as in the past.

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THE WOOD-WORKER has secured a larger circulation than any paper of its kind in America, and is now more than self-sustaining. And all this has been accomplished on its merits, for we have employed no touters or canvassers to force it on the market, neither has it drawn any support from advertising patronage. These facts are worthy of notice, and will, no doubt, have some favorable effect on our readers, and induce them to speak a good word for us whenever occasion presents itself. A kindly word of recommendation now and again will enlarge our subscription list, and each additional name added thereto will aid us to make our pages more interesting, attractive, and useful.

CHRISTMAS and New Year's presents are always acceptable, and none more so than those that have been formed by the hands and skill of the donor. What nicer gift can a young man offer to a lady friend, a sister, a mother, or a wife, than a cabinet, a wall table, a pedestal, or a picture-frame, fashioned by his own hands? In the present number we offer a variety of designs of such things as can be made by any persevering amateur, and there is not one of them that cannot be made—by application—before New Year's eve.

We are willing to give any further information regarding these designs that may be asked of us, and we should like to give whatever assistance we can to any of our amateur friends who may desire to try their hands at making useful CHRISTMAS PRESENTS.

OF late years it has become the fashion to finish the interior of homes in hard woods, and in a style that partakes of cabinet-work. This style of work necessitates the employment of the most skilled workmen, for the ordinary wood-butcher, or even the medium skilled joiner, stands a poor chance of turning out satisfactory work where every joint must be invisible, and neither putty nor paint can be called to his assistance. A great portion of this work is now done by regular cabinet-makers, who can make more at house finishing than in the cabinet shop. This in a measure accounts for the scarcity of skilled workmen. The pay being better for that class of work than for ordinary shop work, the best men find their way to those firms who engage in house finishing, not only because of better wages, but the work is steady.

There is no reason why the ordinary house-joiner should be displaced by the cabinet-maker. Indeed, as a general thing the house-joiner is much more skilled in constructive art than the cabinet-maker, but he has very little knowledge, as a rule, of the art of finishing and polishing the work when constructed. He should make these branches a study, for there can be no doubt that for many years to come interior cabinet-finish will be the rage, and every house built during this period of any pretensions will have one or more rooms fitted up in this style; and, as stated above, the better the workman the better the pay, and a greater certainty of steady employment.

THE firm of John Stephenson & Co., of New York, are building for the London street railways the short one-horse cars, sometimes called "match-box" and "bob-tail" cars. They have the American style of pay-boxes, iron horse guards at the dash-boards, and are finely finished, with upholstered seats. The excellence of our hard-woods enables us to build these cars much lighter than can be done in England. The same firm has already shipped 50 two-horse cars for the street railway in South London.

WE have received a number of inquiries concerning the papers on "Isometrical Projection," which we published in previous issues. We take this opportunity of informing our correspondents that it is our intention to continue the papers in our next volume. We shall also publish a number of papers on Practical Carpentry, Hand-Railing, Joinery, and Cabinet-Work. The papers on the Steel Square will also be continued to completion. We may mention right here, also, that we have made arrangements for the publication of a number of original papers on constructive art that will commend themselves to both the amateur and professional wood-worker.

THE cost of railroad cars, according to one of the largest car-building companies in this country, is as follows: The average price of box cars is from $400 to $450; in 1872 they were as high as $1200. A milk car costs about $100 more than an ordinary box freight car—that is, when the box is not changed. A baggage car truck and a passenger car truck are about the same. The price of a baggage car varies from $2000 to $2500. The cheapest style of Wagner's drawing-room cars can be made for $8000; the usual price is $12,000. This includes all the furnishing. The cheaper drawing cars, four wheels, are made for $10,000. The ordinary mail car costs from $2000 to $3000; distributing cars more. Cars for the New York Elevated road cost from $2500 to $3000. The ordinary passenger cars built for the Hudson River road cost $4500, including a heater and some extra fixtures. Small cars for carrying ore cost $200.

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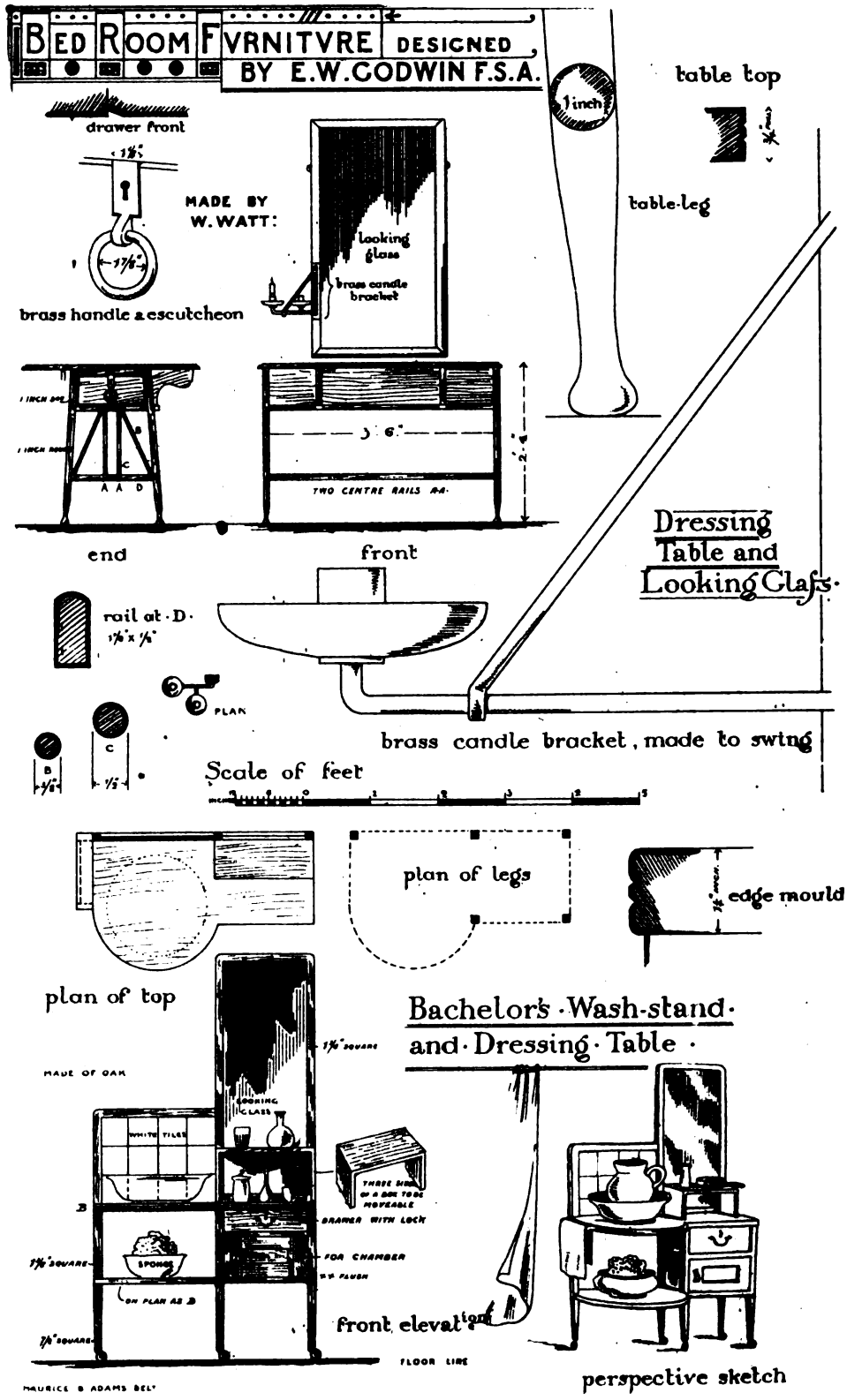
PLATE. 90



CHAMBER SUIT

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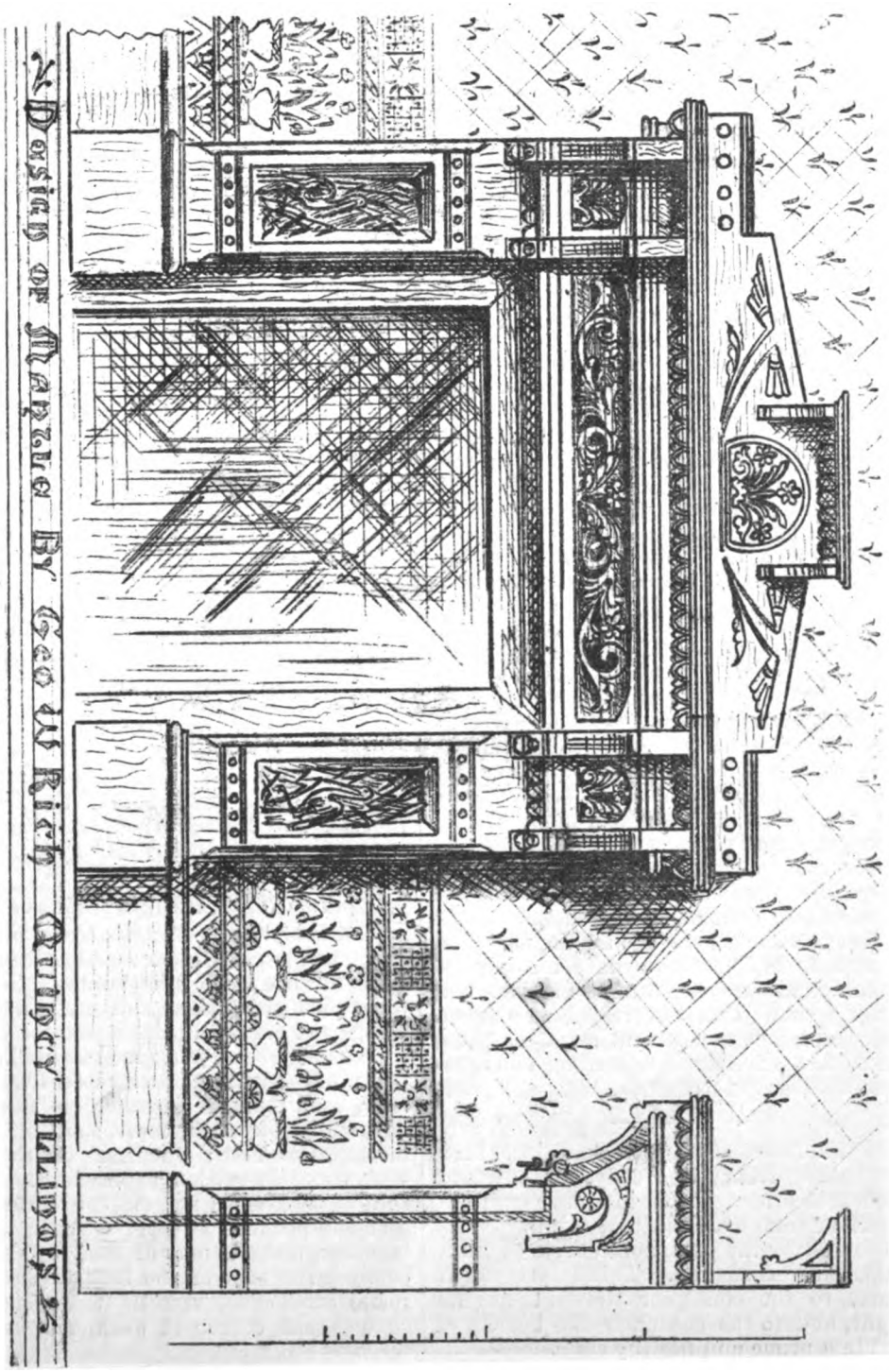
PLATE 91



MANTEL.

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PERHAPS in no business is the "boom of revival" felt so much as in that of the manufacture of painted furniture. In and around Boston, New York, and Philadelphia this particular manufacture is quite lively. This pleasant state of affairs may be attributed to the returning prosperity of the manufacturing interests, for this style of furniture is generally sold to the better class of mechanics and machine hands. The higher grades of this sort of furniture is also bought largely by well-to-do farmers and small traders in the country, who furnish their "spare" rooms with it.

CARPENTERS should remember that fresh glue dries much more readily than that which has been once or twice melted. Dry glue steeped in cold water absorbs different quantities of water, according to the quality of the glue, while the proportion of the water so absorbed may be used as a test of the quality of the glue. From careful experiments with dry glue immersed for twenty-four hours in water, at 60° Fahrenheit, and thereby transformed into a jelly, it was found that the finest ordinary glue, or that made from white bones, absorbs twelve times its weight of water in twenty-four hours; from dark bones, the glue absorbs nine times its weight of water, while the ordinary glue, made from animal refuse, absorbs but three to five times its weight of water.

A VERY beautiful parlor coach has just been built by the Harlan & Hollingsworth Co., of Wilmington, Del., for the Woodruff Palace Car Co., and intended to run on the Jacksonville, Pensacola & Mobile road. It is the C. E. Lucas patent, and cost $10,000. The interior arrangement and finish are exceedingly elegant and well adapted to the comfort and convenience of passengers. At each end are toilet and retiring-rooms for ladies and gentlemen, and accommodations for the porter. There is also an electrical call apparatus. The seats have nickel-plate trimming, and are upholstered in green and scarlet plush. The sleeping berths when closed represent a beautiful series of panel work. The exterior is a maroon color, relieved with striping of green, blue, and gold.

AN improved stock car has just been patented by Henry S. Moody, the object of which is to protect cattle, in course of transportation, from bodily injury, to allay fever, and to destroy the pernicious effects of heat, thirst, and exhaustion. This improvement secures to the consignor the full normal weight, and to the consumer the benefit of meat in a prime and healthy state.

OAK, says *Der Techniker*, may be so dyed as to resemble ebony. Soak it for 48 hours in a hot saturated solution of alum, and then paint it with a decoction of one part campeachy wood in 11 parts water. This decoction should be first filtered and slowly boiled down to one half its volume, when 10 to 15 drops of neutral tincture of indigo should be added for every quart it contains. After the application of this solution, the wood should be rubbed with a saturated solution of verdigris in acetic acid until the desired tint is obtained.

DURING the current volume we have published technical matter that could not be obtained in any bookstore in America for a less sum than TEN DOLLARS.

WE can only furnish a limited number (complete) of the present volume, bound or unbound, so that parties wishing complete sets should order at once, or they may be too late.

Cutting Fretwork.

ON commencing work, first draw your pattern on the wood intended for use, and in all the spaces which are to be cut out bore holes with a small gimlet (a brad-awl is the best). Then fasten your screw at one end in the frame, pass the other through one of the holes wherever you intend to commence, and fasten it in its place in the frame. In using the saw keep it perfectly upright, and do not press it too hard against the wood, but let it play freely, or else it will cut out of square altogether and spoil the work. Some people use a clamp for doing large pieces, but it is much easier to do without it. After your sawing is finished take the strain off the saw and frame; then sand-paper your work, and polish or varnish as you think fit.

A Rustic Hanging Basket.

TAKE three ends of cigar boxes, cut them into triangles, glue them together into shape, paint in some color like bronze. Get from the woods grape-vines and any pretty rustic things you may find; cut a piece of vine five inches long, bend and glue two inches from point of basket, another piece five inches long, bend the ends together, tie them, glue on the first piece two more short ones to go inside of the first; glue them on the basket crosswise, take two longer ones for the handle, split at both ends, lap on two corners, and glue another for the other corner; tie them together, make a loop of vines to hang by; begin at the edge of the basket, glue on the rustic ornaments, varnish it. Place half a cone at each corner of work, and in the interstices put moss.

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Correspondence.

We invite communications from our readers in matters connected with the trades we represent. Be brief, courteous, and to the point.

Editor of the Wood-Worker:

The last issue of the Wood-Worker is the best yet out. Give it to us fortnightly, or *weekly*, next year, if possible. Better worth ten cents per number than any publication I know of. M. P. Smith.

Editor of the Wood-Worker:

In the September number of the Wood-Worker there is an illustration by Mr. Riddell on Projection which I don't quite understand. I would like to have explained through your columns how the points for describing the ellipse shown are obtained; also, how the bevels are found.

In the article in question your readers are referred to back numbers of the Wood-Worker for information; but this is somewhat indefinite, as unskilled readers do not know how to apply previous illustrations to the matter in hand.

A little more light on the subject would certainly be of service to a subscriber from the first. Wm. R.

[In reference to the above we may say that "Wm. R." will find a method for describing an ellipse on Plate 22, Fig. 1, March number of the Wood-Worker. This method can easily be adapted to the problem that seems to puzzle our correspondent so much. In a subsequent number we will give an illustration showing how the method is applied, and how the bevels are obtained and used.—Ed.]

Editor of the Wood-Worker:

I have taken your paper from the first, and on the whole am much pleased with it, though compelled to say its usefulness is very much lessened by the drawings being without scale, and in most cases without any plan of the frame, or idea as to finish. I am an amateur in wood, and am able to form pretty correct estimates of height, width, etc., by comparison with something else in the drawing; for instance, with a chair, or some other article of generally the same height, but this cannot be done in all cases; for if we take Plate 69, September number, the term "small" Japanese cabinet is used. Now the term "small" is so indefinite that I am entirely at a loss to know whether it is small as compared with one 6 or 8 feet high, or with one 3 feet high. This is no doubt due to my want of skill in such matters, but as your journal is for amateurs as well as professionals, I am satisfied it would be much more highly appreciated if these little points were attended to more in detail. At present it is very much like making your own design to determine the size, detail, finish, etc., suitable for any given piece.

H. B.

[The above letter was not intended for publication, but as we have received several letters written in the same vein during the last month, we are persuaded that the subject is deserving of consideration, and we are sure our designers will keep the above hints in mind when preparing drawings for our pages in future. At any rate, we are fully convinced that, when possible, it would enhance the usefulness of the designs reproduced if a graphic scale was added to each one.—Ed.]

We are in receipt of a communication from L. D. Gould, author of "The American Stair-Builders' Guide," in answer to a criticism of his work in our November number by Wm. H. Croker. The communication came to hand too late for publication in the present issue, but will appear in the January number of the Wood-Worker.

Intercommunication.

This department is intended to furnish, for the benefit of all our readers, practical information regarding the art of manipulating wood by hand or machinery; and we trust that every reader of our paper will make the fullest use of it, both in asking and answering. All persons possessing additional or more correct information than that which is given relating to the queries published, are cordially invited to forward it to us for publication. All questions will be numbered, and in replying it will be absolutely necessary, in order to secure due insertion, that the number and title of the question answered should be given; and in sending questions, the title of key-words of the question should be placed at the head of the paper. Correspondents should in all cases send their addresses, not necessarily for publication, but for future reference. We also request that all questions or answers be written on separate slips of paper, and addressed to the Editor. Notes of practical interest will be welcome at all times. When drawings are sent to illustrate answers to questions, or for full pages, they should be on separate slips, and should be drawn in ink on clean, white paper. Short questions, requiring short answers, may be asked and answered through the agency of postal cards.

When answers to questions are wanted by mail, the querist must send a stamp for return postage.

Queries.

96. Baluster.—How is the body of balusters formed by machinery into octagon twists, or rope moulding? I have been informed that it is done in a lathe, but the process was not explained. Any one enlightening me will much oblige.—E. K.

97. Rope Moulding.—Is there any machine outside of a moulding machine that will make rope-moulding expeditiously? How is it done on a moulding machine, and can it be turned out in long pieces, say 12 feet on the lathe? A full explanation of the process of manufacturing rope moulding from you, or any of your readers, will please Rope Moulding.

98. Gelatine.—Could you, or any of your readers, give me any information on "carton-pier" and gelatine moulds? By doing so you will oblige a Subscriber.

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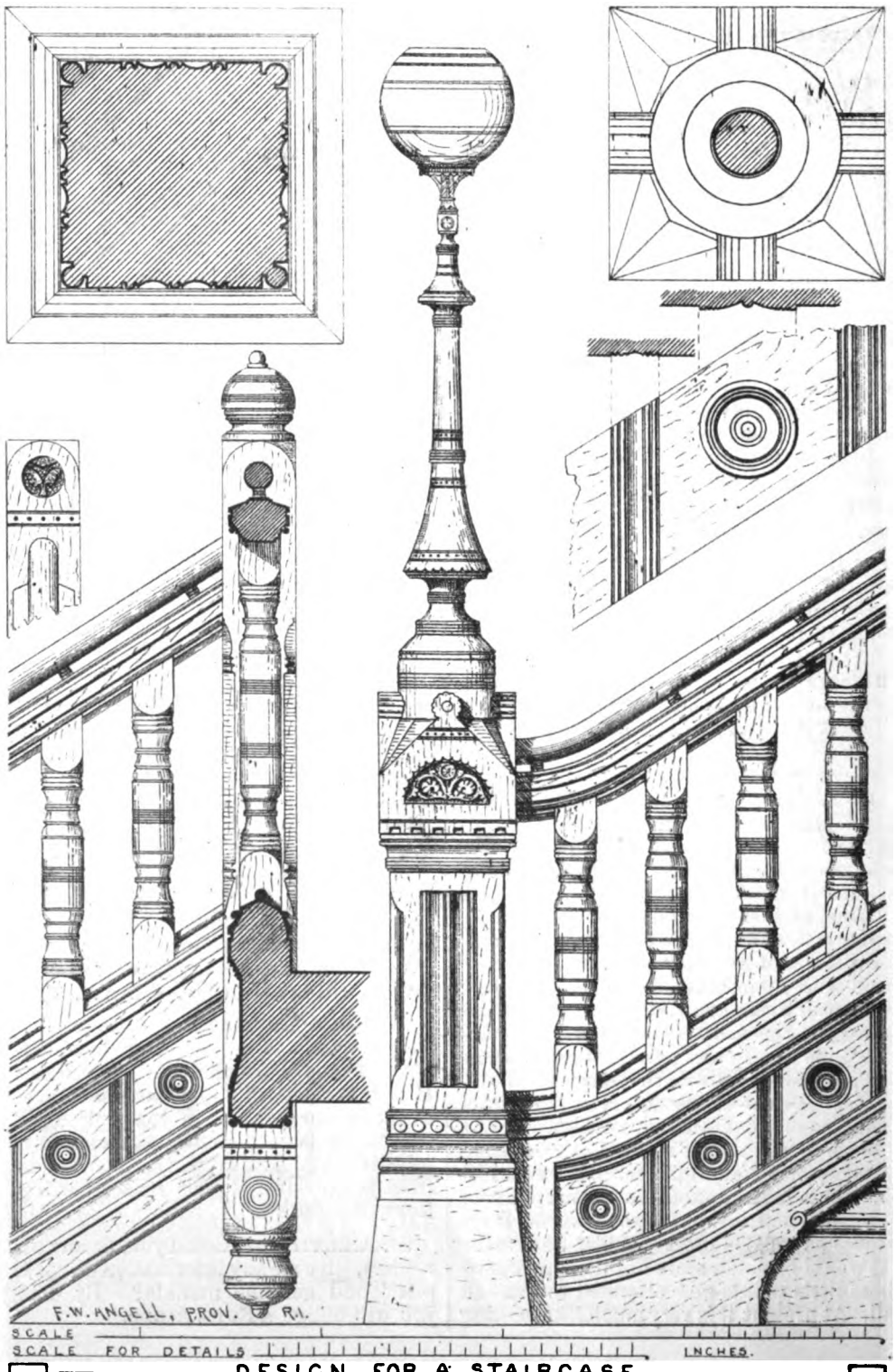
PLATE.92



DESIGN FOR A STAIRCASE.

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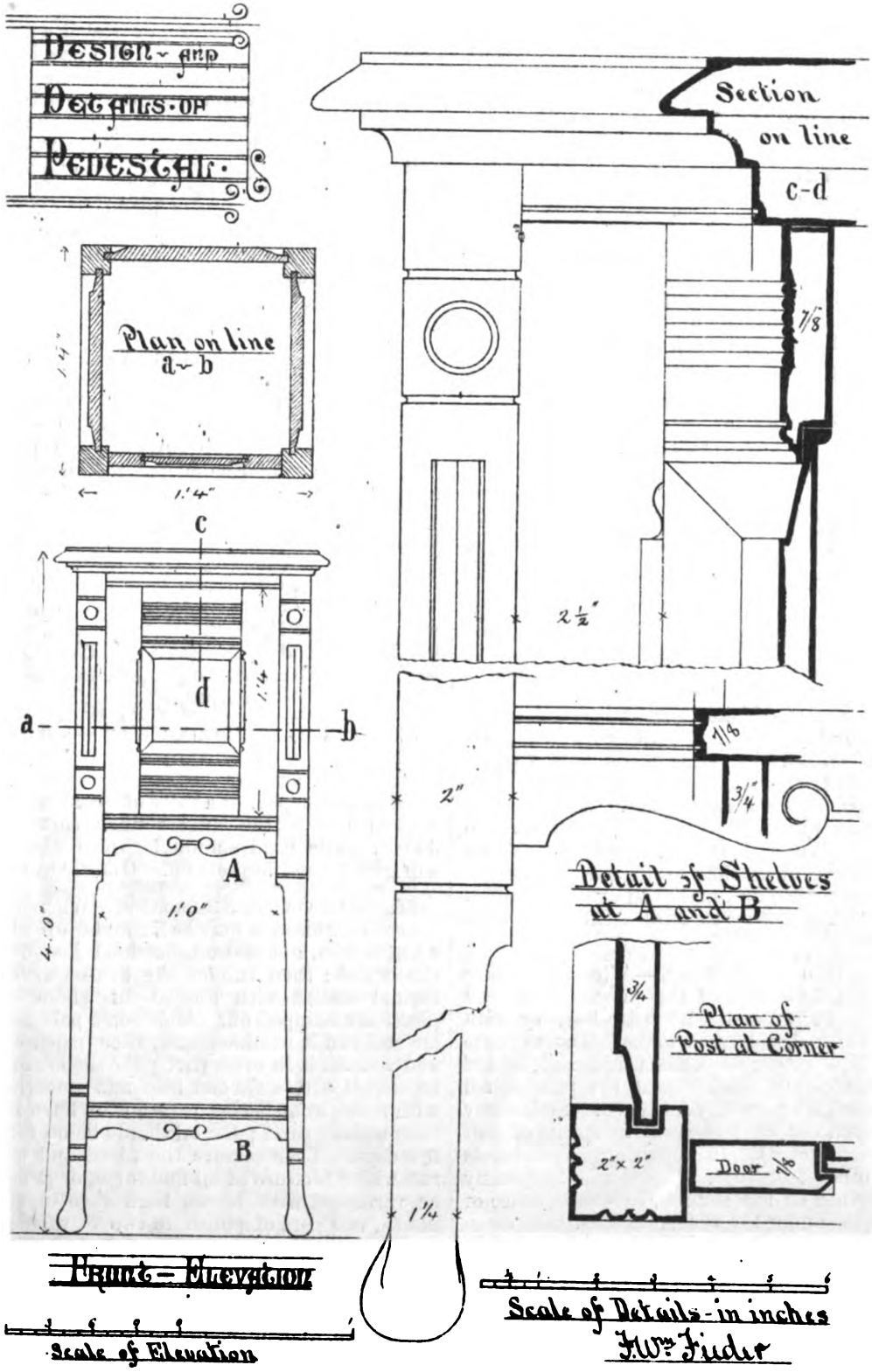
PLATE 83



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99. HAND AND FOOT-POWER MACHINES.—Will some one who has had experience with circular saws driven by hand or foot give me some information regarding their experience with said machines? I wish to know who makes the best machines, and if a foot-power machine is capable of cutting 1½-inch stuff with ease? How many feet (run) will the best cut in a day of ten hours? Can door-tenons be cut with them?—HAG'S TOOTH.

100. WHITE HOLLY.—How is white holly stained a dark brown for scroll-sawing?—AMATEUR.

101. DOOR FOR HANGING CABINET.—Will some of your contributors please furnish a design for a door in which a round china plaque has been inserted? The door is for a hanging cabinet.—JONGLEUR.

102. DRAWING.—Will some one give me the definition of Solid and Free-Hand Drawing?—STUDENT.

Answers.

WE wish it distinctly understood that we do not hold ourselves responsible for the accuracy or reliability of answers furnished to this department by our correspondents.

We cordially invite our readers to take an active part in this department, as we are confident that much good can be accomplished by a free interchange of ideas and opinions in regard to subjects connected with the art of wood-working.

Many persons are afraid to write to a public journal because of their lack of literary attainments; to such we would say: Give us your ideas in such language as you can command, and leave the rest to us. It is ideas and opinions we want, such as may be of use to the workingman or amateur. Answers should be sent to this office on or before the fifteenth of each month, to insure insertion in the next issue.

85. STAIN.—Take 1 quart of alcohol, 3 ozs. of ground turmeric, 1½ oz. of powdered gamboge. When the mixture has been steeped to its full strength, strain through fine muslin. It is then ready for use. Apply with a piece of fine sponge, giving the work two coats. When it is dry, sand-paper down very fine. It is then ready for varnish or French polish, and makes an excellent imitation of the most beautiful satinwood.—RUPERT.

86. OLD FURNITURE.—After you have completed the repairs the pieces introduced should be washed with soap-lees, or with quicklime dissolved in water. The mixture should be rather weak when first used, and if not sufficiently dark repeat the process till the wood is adequately darkened. Stains may be taken out of mahogany by spirits of salt (muriatic acid). In repairing old cabinets and other furniture, blisters will frequently be formed on the surface, in consequence of the glue under the veneer failing, thus causing the veneer to separate from the ground in patches, and these blisters are so situated that, while separating the whole veneer from the ground, it is impossible to introduce any glue between them to relay it; the great difficulty is to separate the veneer from the ground without injuring it. The process may be successfully performed as follows: Wash the surface with boiling water, and with a coarse cloth remove dirt or grease; then place it before the fire, or heat it with a candle; moisten the surface with linseed oil, place it again before the fire, when the heat will cause the oil to penetrate the veneer and soften the glue beneath; then, while still hot, raise the edge with a chisel, and the surface will separate bodily from the ground; be careful not to use too great force. If the surface should become cold during the operation, apply more oil and heat it again; repeat this process till the veneer is entirely separated; then wash off the old glue, and proceed to lay it again as a new veneer.—WILL.

87. CARVERS' SQUEEZING WAX.—Young Carver will find either of the following suitable for his purpose: Take suet, 1 part; beeswax, 2 parts. Wax, 5 parts, olive oil, 1 part. Wax, 4 parts; common turpentine, 1 part. The parts only need be melted together, and allowed to cool; the wax is then fit for use. It should be well pressed into the carving. Sometimes it is only possible to take the front or side of an object at a time, as it must be drawn off in the form of a mould. The sections, when ready, should be filled with plaster of Paris and water, made into a thick paste, and allowed to set. The mould is then removed, and the plaster cast is ready to work from.—AMATEUR.

87. CARVERS' SQUEEZING WAX.—Carvers, in cutting moulds for compo, papier-maché, candies, etc., use soft wax as they progress to regulate the depth, or a piece of bread can be worked up in the fingers until soft like dough. The head should be fresh when it will give a good impression.—OLD CARVER.

88. MAHOGANY SIDEBOARD.—When the veneer is bruised it may be brought up with a warm iron, not laid on, but held just over the bruise; then rub on the bruise with a flannel soaked with linseed oil where the pieces are chipped off. Melt some pale shellac and run it in the places, then paper off, and well oil it in every part; the shellac may be melted with a red-hot iron and smoothed with a hot iron, taking care not to burn the surrounding parts; the oil should lie on for a few days. Then remove the same, and well rub with a mixture of oil and turps, or it may be varnished with brown hard varnish and polish, one part of polish to two of varnish. If the corners have large pieces of veneer out, better lay in other pieces, cutting out the broken edges with a sharp knife, glueing in new pieces; the new pieces should be damped with hot water, then glued and pressed in

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place with a hot iron; the best plan is to lay a larger piece than required. Keep in place with a heavy weight or thumbscrew; when dry finish off with chisel and glass-paper. The new veneer will be lighter than the other parts; to darken, wet the new veneer with lime water, then let it dry. If not dark enough, give another coat, but due allowance should be made for the varnish, as this will darken a little. If care be used, the new may be made to match the old to a nicety. Shellac should be only used for small places, chips, holes, etc.—MUSTY.

90. PICTURE-FRAMES.—There seems to be no valid reason why picture-frames of large size should not be made of thin brass, stamped in varied designs, and richly gilded. The material would be much lighter, the gilding more permanent, and the cost considerably less, than the covered wood in use at present. Let the frames be made up of very short lengths, with mitred pieces separate. The connection could be effected instantly by just leaving a flange at the end of each piece, and biting this flange over neatly with a pair of pliers. Prepare a rough wooden frame to hold the oil-canvas, or other picture, and on to this frame screw or otherwise simply affix the brasswork, and grace, strength, and economy would each be the gainers. If this should succeed with picture-frames, probably it might be advantageously introduced for frames in other directions—for the toilet, etc.—PORTRAIT.

91. GLUE.—Glue frequently cracks because of the dryness of the air in rooms warmed by stoves. An Austrian paper recommends the addition of a little chloride of calcium to glue to prevent this.—X.

92. AILANTHUS.—In experiments made in the French dockyard at Toulon, where the wood of this tree was tested as to its tenacity, or ability to resist a strain, in comparison with the timber of European elm and oak, an average of seven trials showed that the ailanthus broke with a weight of 72,186 pounds, while the elm in a similar number of trials yielded to 54,707 pounds, and the oak, in the average of ten specimens, broke under a weight of 43,434 pounds. Evidence as to the value of ailanthus timber in exposed situations as to its durability when set in the ground is yet meagre, but the little that we have is favorable. Of its value for interior work and for cabinet-making there can be no doubt, the wood possessing properties remarkable in so rapid-growing a tree. The wood is at first of a pale straw-color, but grows somewhat darker with age, and takes a high polish. When cut to show the silver grain it presents a satiny lustre; and as regards freedom from warping and shrinking, it is superior to walnut, and fully equal to mahogany. It is said to cut up economically, seasons readily, is easily worked, is free from unpleasant odor, and has no ill-effects on the tools. For the treads of stairs, the floors of offices, mills, and other buildings, where constant use requires a hard, strong wood, it is probably superior to any of the woods commonly employed in such situations. There is one use for which its freedom from tendency to shrink will especially commend it—*i.e.*, interior finishing. Its warm color will make it very effective, when used with both lighter and darker woods.

89. CURIOSITY.—To dye veneers, soak them for 24 hours in a solution of caustic soda containing 10 per cent of soda, and boiled therein for half an hour; after washing them with sufficient water to remove the alkali, they may be dyed through these means by keeping them under the surface of the dye by a weight, a stone being preferable for that purpose. Solution of caustic soda can be made by taking 3 ounces of washing soda, 1½ ounce of lime, and 2 pints of water. Let the water be boiling, and pour one half of it on the soda. Slake the lime, and pour the balance of the water on it. Mix the hot liquors, and boil for ten minutes and stir constantly. Then set aside on a covered vessel to settle, and pour off the water. Take 10 parts of this solution, and add it to 90 parts of water to make the alkaline bath mentioned above.—EUREKA.

91. GLUE. — To prevent glue cracking when dry, add about one tablespoonful of glycerine to a pint of the solution while it is hot.—EUREKA.

94. YOUNG DRAUGHTSMAN.—Sun Tracings—Blue. First solution: Ammonia citrate of iron, 1⅛ ounce; water, 1½ ounce. Dissolve. Second solution: Red prussiate potassa, 1¼ ounce; water, 8 ounces. Dissolve. Place the first solution in a shallow vessel (not metal) and immerse the paper for five minutes or so. Take it out; drain and dry in the dark. Place it with the print to be copied in a photographer's printing frame, and expose to the sun, examining it occasionally to see that it is being printed distinctly; then take it out and wash thoroughly in water and dry.

For Black Printing. — First solution: Perchloride of iron, 50 grains; tartaric acid, 15 grains; water, 1 ounce. Soak the paper in it, and expose in printing frame. Then plunge for an instant in water; then in a saturated solution of either gallic acid or decoction of galls or a mixture of gallic and pyrogallic acids. The impression is gallotannate of peroxide of iron. Soft water must be used in the above printing operations.—EUREKA.

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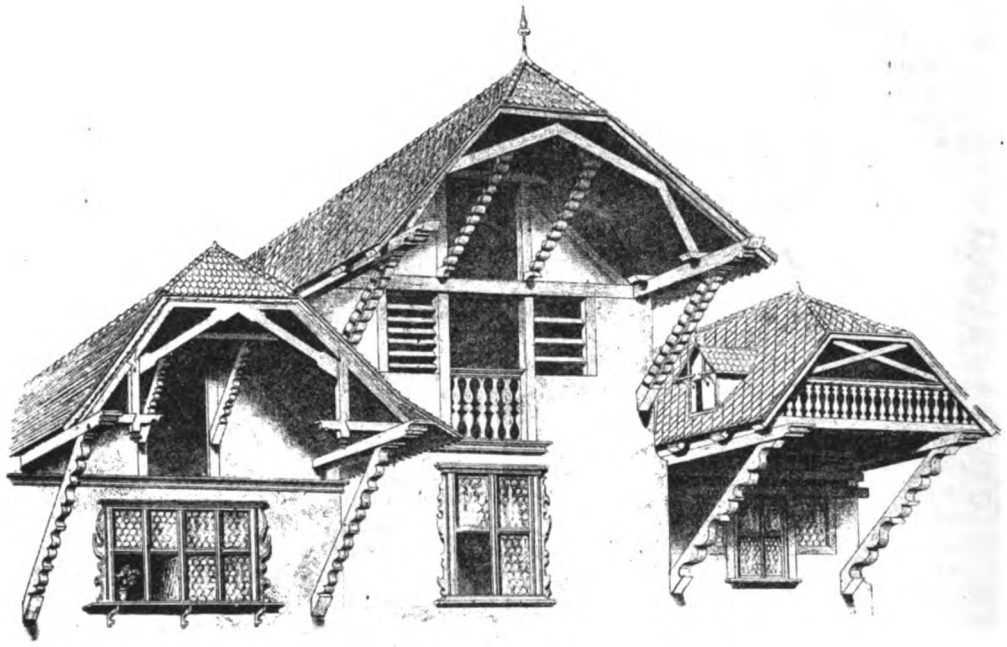
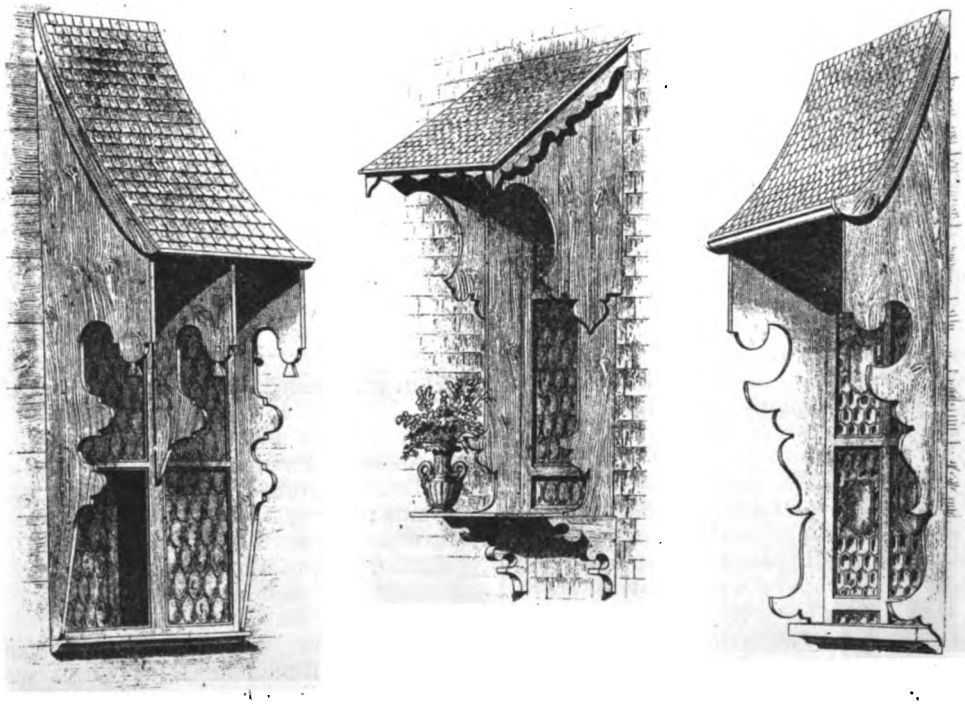
PLATE. 94





EXAMPLES OF SWISS ARCHITECTURE.

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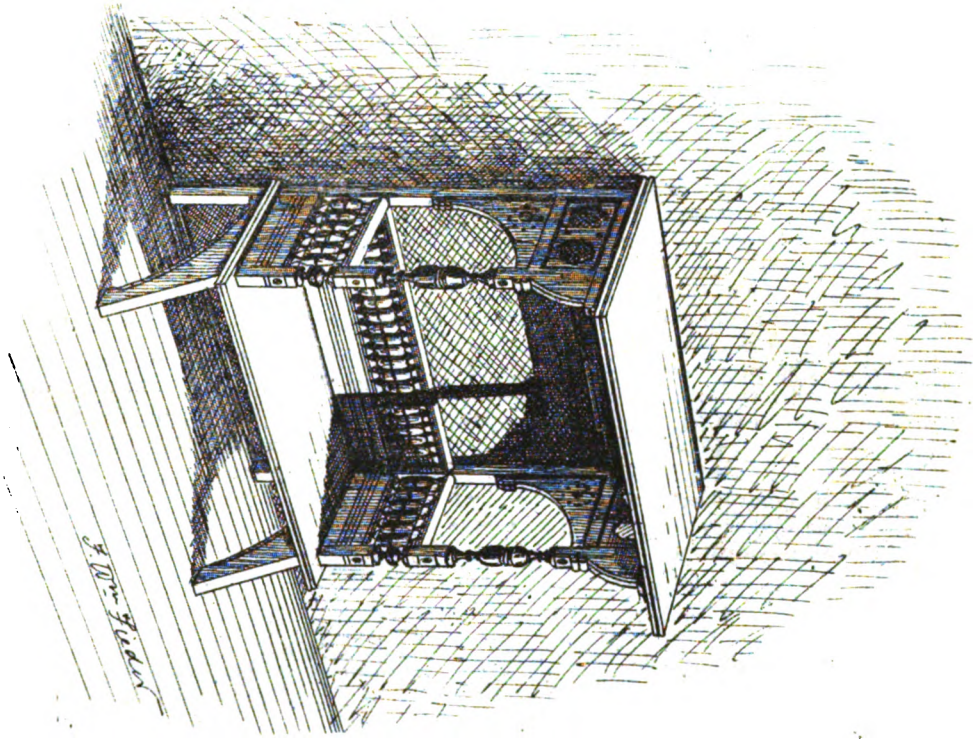
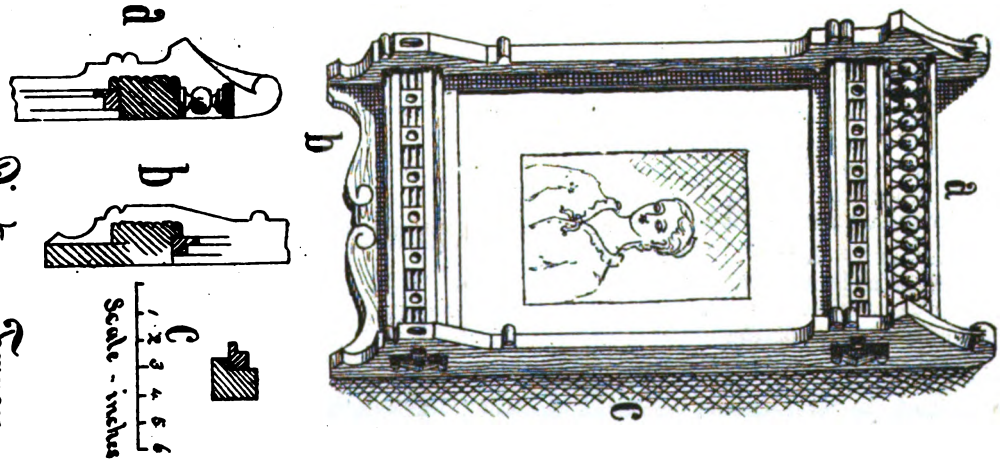
PLATE.95

Wall Table



Picture Frame



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94. SUN TRACINGS.—For the benefit of "Young Draughtsman," who wishes to know the process of making sun tracings from drawings, I send you the following method, as practised by myself and many others in this city: For convenience in measurement the draughtsman should provide himself with a black or very dark blue bottle that will hold about twenty ounces of water, and cover it with cloth or any material that will exclude the light. Into this put 1⅛ ounce of citrate of iron and ammonia, 1¼ ounce of red prussiate of potash, and fill with water. The bottle should then be put away in a dark place till the mixture is dissolved, which will be in about five hours. The paper to be printed should be coated evenly on one side with the mixture, and allowed to dry, when it will be ready for use. The drawings to be copied should be made on transparent tracing cloth, and drawn distinctly with very black ink. The prepared paper is then laid on a flat, smooth surface, with the drawing spread smoothly over it, and both covered with a piece of plate glass and exposed to the sun for ten or fifteen minutes. The prepared paper is then removed and washed with clean water till the lines of the drawing appear perfectly white.—J. M. D.

93. PIANO. — A writer has taken the trouble to give the actual material used in constructing a piano-forte. In every instrument there are fifteen kinds of wood—viz., pine, maple, spruce, cherry, walnut, white-wood, apple, basswood, and birch, all of which are indigenous; and mahogany, ebony, holly, cedar, beech, and rosewood, from Honduras, Ceylon, England, South America, and Germany. In this combination elasticity, strength, pliability, toughness, resonance, lightness, durability, and beauty are individual qualities, and the general result is voice. There are also used of the metals iron, steel, brass, white metal, gun metal, and lead. There are in the same instrument of seven and one half octaves, when completed, 214 strings, making a total length of 787 feet of steel wire, and 500 feet of white covering wire. Such a piano will weigh from 900 to 1000 pounds, and will last, with constant use, not abuse, fifteen or twenty years.

[We see no valid reason why a *skilful amateur* should not be able to construct a piano. Such things have been done by amateurs, and may be again.—ED.]

95. CAUL.—A "caul" is a piece of wood shaped so as to fit over veneering to hold it in place whilst drying. It is sometimes warmed before applying to the veneer; hence the phrase, "Caul warm or cold." The caul is held firmly on to the veneer, and the work to be veneered by a number of hand-screws or other suitable device.—NED.

J. WILLIS, Newark; Tom Watts, Philadelphia; J. B. Hartford, and Thomas Dury, Milwaukee, are informed that Plate 48, June number of the WOOD-WORKER, was designed by F. W. Fieder, of this city, as was also Plate 45, in the same number, which shows two elevations for a square bay window.

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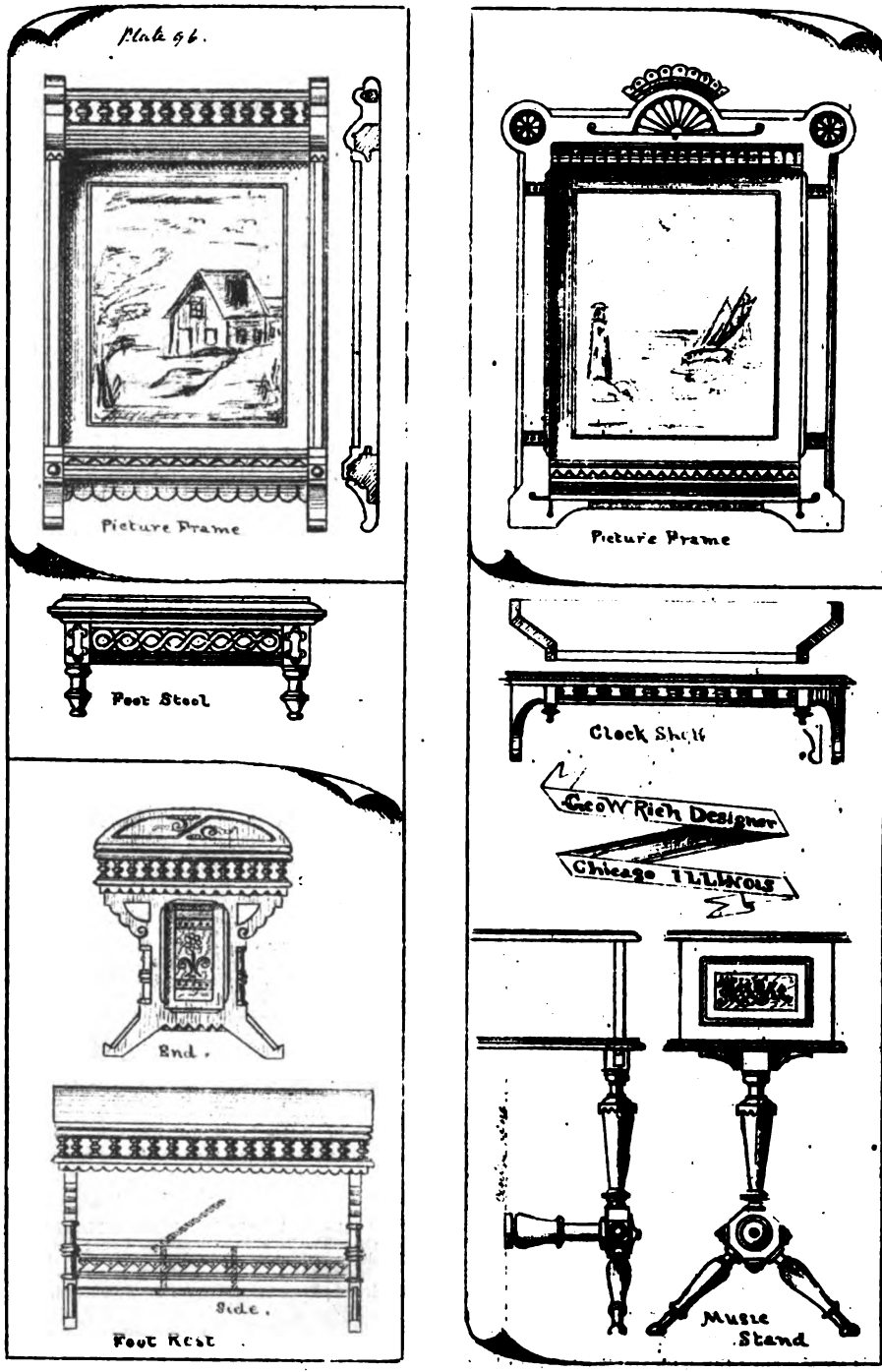
PLATE. 96



STUDIES FOR AMATEURS.

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